THE ROLE OF LENDER IDENTITY IN LOW-INCOME LENDING

By

DAVID MICHAEL HARRISON

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1998

I dedicate this dissertation to my wife, Amy, who was full of encouragement, even during bad times. Without her love, support, and understanding I would have never survived the past four years. I would also like to dedicate this dissertation to my son. Aaron, you have truly been my inspiration. More than anyone else, including my committee members, you have provided me the motivation to complete this disseration. Thanks Am- and AarBear!

ACKNOWLEDGEMENTS

I gratefully acknowledge the help, patience, advice, and support of my dissertation committee members: Christopher M. James, David C. Ling, Joel F. Houston, Wayne R. Archer, and Marc T. Smith. Specifically, the expert knowledge and unique insight into the financial services industry provided by Chris have truly enhanced the quality of this work. More than any other person, Dave has been my mentor and big brother in showing me what "academic research" is really about. Wayne, a true friend, fellow Shocker, and expert orator, always knew exactly how to focus my (sometimes rambling) attempts at writing. With an open door policy, Joel was always ready, willing, and able to help. Finally, Marc has been the ideal outside committee member -- interested and knowledgeable, but not overbearing. I sincerely hope we find additional projects to work on together in the future.

I would also like to thank the University of Florida's Department of Finance, Insurance, and Real Estate, as well as the Real Estate Research Center, for their financial support. Dean Gatzlaff and Greg Smersh provided excellent assistance with the datasets, while Mark Flannery, Mike Ryngaert, Gary McGill, and Shawn Thomas provided useful comments on early drafts of this manuscript. In addition, I wish to recognize the contributions of seminar participants at the University of Florida, Saint Louis University, Suffolk University, University of Rhode Island, Salisbury State University, Office of the

Comptroller of the Currency, Freddie Mac, Bowling Green State University, North Texas State University, University of Vermont, Southern Illinois University at Carbondale, the 1998 American Real Estate and Urban Economics Association annual meeting, and the 1997 and 1998 American Real Estate Society annual meetings.

TABLE OF CONTENTS

page

ACKNOWLEGMENTS . . . iii

ABSTRACT . . . vii

CHAPTERS

1 INTRODUCTION
THE ROLE OF LENDER IDENTITY . . . 1

2 BANK-SPECIFIC CHARACTERISTICS AS A DETERMINANT OF COMMUNITY REINVESTMENT ACT (CRA) PERFORMANCE . . . 6

Introduction . . . 6
Previous Literature . . . 12
Cross-sectional Variability of Banks and the Effect on CRA Ratings . . . 17
Data and Methodology . . . 20
Results . . . 25
Conclusion . . . 46

3 THE IMPORTANCE OF LENDER HETEROGENEITY IN MORTGAGE LENDING . . . 48

Introduction . . . 48
Lender Heterogeneity . . . 49
Data and Methodology . . . 51
Empirical Results . . . 63
Summary and Conclusions . . . 81

4 THE PROFITABILITY OF COMMUNITY REIVESTMENT ACT LENDING: EVIDENCE FROM RATING REVISIONS . . . 83

Introduction . . . 83

The Community Reinvestment Act: A Brief History 85
Data, Motivation, and Methodology 87
Empirical Results 95
Summary and Conclusions 104

5 CONCLUSION
THE FUTURE OF LOW-INCOME LENDING:
WHAT WE KNOW AND WHAT WE NEED TO KNOW 106

BIBLIOGRAPHY 110

BIOGRAPHICAL SKETCH 117

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

THE ROLE OF LENDER IDENTITY IN LOW-INCOME LENDING

By

David Michael Harrison

August 1998

Chairman: Chistopher M. James
Major Department: Department of Finance, Insurance, and Real Estate

The vast majority of residential mortgage market transactions within this country involve the use of borrowed money. While numerous studies have gone to great lengths examining which borrower characteristics influence the functioning and operation of this market, very little attention has been given to the divergent roles played by financial institutions with differing operating characteristics. The current study investigates the severity of this omitted variables problem by examining the importance of such inter-lender differences from regulatory, borrower, and managerial perspectives. First, from a regulatory perspective, I employ an ordered probit model and a sample of 1,188 financial institutions evaluated for Community Reinvestment Act (CRA) compliance during the second half of 1990 to find large banks, and profitable banks, receive better compliance evaluations than their counterparts. In addition, holding company banks are also shown to receive higher grades, primarily due to the targeted regulatory enforcement mechanism of approval authority on merger, acquisition, and expansion activities. Secondly, from a borrower perspective, I use a sample of Home Mortgage Disclosure Act (HMDA) records from Pinellas county (St. Petersburg) Florida to find that the choice of potential lender significantly influences the probability of approval on applications for home purchase mortgage applications. The inclusion of lender identity significantly increases the explanatory power of traditional accept/reject decision models and, in addition, the inclusion of lender characteristics eliminates all evidence of "red-lining" or race effects documented in previous studies. Finally, from a managerial perspective, I use a sample of 1,467 CRA rating revisions of FDIC regulated banks between 1990 and 1995, to answer the key question of whether low-income lending is profitable. I find institutions receiving upgrades are characterized by either lower profitability within their lending activities or increased riskiness within their loan portfolios. These results suggest CRA lending is not as profitable as the traditional activities of most banks. The combined results of this investigation shed new light on a previously unexplored dimension of the low-income mortgage market--the role of lender identity.

CHAPTER 1
INTRODUCTION:
THE ROLE OF LENDER IDENTITY

More than five years after the landmark Federal Reserve Bank of Boston study of discrimination in home mortgage markets, debate over the existence, persistence, and economic significance of disparate lending outcomes continues to rage. As the debate has intensified, its scope has expanded to encompass not only geographic analyses of lending patterns, but broader measures of applicant creditworthiness and neighborhood risk factors. The ever expanding information set employed within recent investigations has led to a much better understanding of the mortgage market, however, the existing literature remains woefully inadequate. While the vast majority of residential real estate transactions involve borrowed money, virtually no attention has been given to the role lenders play within this market. Previous studies have either implicitly assumed lending institutions are cross-sectionally identical, or alternatively, that any inter-bank differences which do indeed exist have no impact on the operating or regulatory environment faced by the institution. The current investigation challenges this assumption and argues lender attributes, including but not limited to their financial position, organizational structure, and community demographics significantly shape the compliance practices each institution chooses to pursue (and the manner in which regulators choose to evaluate such performance). Clearly, observable differences in compliance practices and lending policies which are systematically related to the unique operating characteristics of lending institutions have significant implications for both public policy and continuing research on mortgage markets.

The current study examines the importance of inter-bank differences from three alternative perspectives. First, from a regulatory perspective, the past decade has witnessed heightened governmental emphasis on increasing the flow of credit to traditionally underserved segments of our society. One of the focal points of these interventionist policies has been the strengthened enforcement of Community Reinvestment Act (CRA) provisions, which place an affirmative obligation on mortgage lenders to seek out and meet the unique credit needs of their local communities. Chapter two, entitled "Bank-Specific Characteristics as a Determinant of Community Reinvestment Act (CRA) Performance," examines the potentially disparate burden these regulations place on institutions facing divergent financial and operating characteristics. Specifically, I employ an ordered probit framework, and a sample of 1,188 state, non-member banks evaluated for Community Reinvestment Act (CRA) compliance by the Federal Deposit Insurance Corporation (FDIC) during the second half of 1990, and find profitable banks may have more discretionary resources available to devote to compliance issues (or may face higher regulatory hurdles), institutions with a history of distributing or investing (rather than retaining) cash flows receive higher ratings, and bank size affects compliance performance in a non-linear fashion. In addition, regulators are found to effectively play an important role in enforcing CRA guidelines, as banks within multi-bank holding companies are found to have higher ratings than unaffiliated institutions. Similarly, community based organizations may also influence the regulatory process, as ratings in major metropolitan areas, where community groups should be prevalent and easy to form, appear to be lower than ratings in more rural areas. Finally, an analysis of expanded community (economic and demographic) characteristics reveals, with the exception of race, institutions in counties the Community Reinvestment Act was designed to benefit typically exhibit higher ratings.

Chapter three, entitled "The Importance of Lender Heterogeneity in Mortgage Lending," changes the level of analysis to the individual mortgage applicant, and investigates the influence of lender characteristics on the distribution of mortgage market outcomes. While numerous studies present evidence of an unequal distribution of credit outcomes across racial, gender, and income classifications, many economists argue mortgage markets are relatively efficient, and therefore, any observed disparities are likely the by-product of an omitted variables bias in previous model specifications, or the result of an economically efficient decision making process on the part of lenders. Using data on individual home purchase mortgage applications from Pinellas county (St. Petersburg), Florida, over the period 1993-1995, chapter three conclusively demonstrates that bank-specific characteristics materially influence the underwriting processes of mortgage lenders. Specifically, banks specializing in mortgage lending accept a significantly higher proportion of applications than their generic counterparts. Similarly, increases in an institution's size, risk level, and asset growth rate all lead to lower acceptance rates. Furthermore, the inclusion of lender characteristics eliminates all evidence of "red-lining" or underserved market areas based upon the neighborhood's racial composition or applicant's gender. On the other hand, the magnitude and significance of information externalities are enhanced by expanding the information set of relevant variables to include lender identity. These findings, which represent the first multi-period evidence on the existence of such externalities, suggest previous studies which have omitted the lender's financial and/or operating condition have likely understated the true magnitude of information effects.

Robustness checks on the sample data also yield interesting results. While little evidence is found supporting allegations of banks window dressing acceptance rates or claims of unequal access to credit markets along racial and income classifications, the data indicate potential disparities in the coaching or guidance received by mortgage applicants may indeed vary along these same dimensions. Clearly, the results of chapter three provide ample evidence to mandate the inclusion of lender characteristics in future models of the mortgage underwriting process.

Is Community Reinvestment Act (CRA) lending profitable? Chapter four, entitled "The Profitability of CRA Lending: Evidence from Rating Revisions," changes the analysis to the individual bank level to address exactly this question. Using a sample of 1,467 FDIC regulated financial institutions which had their CRA rating revised between July 1, 1990 and April 15, 1995, I investigate whether profitability and loan loss severity differ under alternative compliance regimes. Specifically, results indicate rapidly growing institutions with an increasing emphasis on lending operations are likely candidates for upgrades. Similarly, institutions characterized by increasing levels of loan loss provisions per dollar of lending volume are also likely to see their compliance ratings improve.

Finally, evidence is presented suggesting increasingly profitable institutions are also more likely to experience CRA rating upgrades than their less profitable counterparts.

After documenting the factors which precipitate rating revisions, the after-market effects of the compliance change on both institutional profitability and loan loss severity are examined. Specifically, the results in chapter four indicate enhancing a firm's CRA related activities is accompanied by either a decrease in the profitability of the institution's lending activities, or alternatively, by an increase in the riskiness of the bank's loan portfolio. Both results indicate CRA lending is not as profitable as the traditional lending activities of most financial institutions.

The evidence presented in this dissertation provides unique insight into the functioning of low-income lending markets from three alternative perspectives. First, banks are shown to face a systematically different regulatory environment regarding consumer compliance based upon their individual operating characteristics. Second, when these unique operating characteristics, or lender identities, are controlled for in traditional mortgage market models, evidence of "red-lining" or underserved market areas disappears. Third, CRA lending programs are shown to be less profitable than the traditional lending activities of most financial institutions. Together, these findings should significantly enhance our understanding of the lower-income segment of the mortgage market.

CHAPTER 2

BANK-SPECIFIC CHARACTERISTICS AS A DETERMINANT OF COMMUNITY REINVESTMENT ACT (CRA) PERFORMANCE

Introduction

The past decade has witnessed a heightened emphasis on increasing the flow of credit to traditionally underserved segments of our society. From additional reporting requirements under the revised Home Mortgage Disclosure Act (HMDA) to the on-going, government supported creation of community development banks, federal lawmakers and regulators have taken an active role in assessing, establishing, and maintaining equality of opportunity in lending.[1] One of the focal points of this renewed government intervention has been strengthened enforcement of Community Reinvestment Act (CRA) provisions.

The Community Reinvestment Act was passed by Congress in 1977 to encourage lenders to provide small business and mortgage financing to members of their local communities. The perception among lawmakers at the time of passage was that banks were failing to meet this obligation, particularly in low- to moderate-income communities. This failure was thought to adversely affect both the individuals of the community, as they were forced to rely on governmental sources of financing, and the federal government, as it was burdened with credit requests which could have been more effectively satisfied through private credit channels. Specifically, the legislation called for financial institutions to be periodically evaluated along five dimensions, encompassing twelve performance factors, designed to measure an institution's ability and willingness to meet the credit needs of its local customers. The specific categories and performance factors used to assess an institution's compliance performance are outlined in Table 2-1.[2]

---

[1] While the Home Mortgage Disclosure Act (HMDA) was originally passed in 1975, its scope has been expanded over time, most notably in 1990, to cover more types of lenders and require expanded data collection.

From the inception of the Community Reinvestment Act (CRA) through the 1980s, results of regulatory compliance evaluations were considered proprietary information of the institutions in question. In addition to the lack of public disclosure, the evaluations failed to establish strict performance benchmarks. Based on a 1 to 5 (1=best) numeric scale similar to CAMEL ratings, over 97% of FDIC evaluated institutions received a grade of 1 or 2.[3] Calls for a tougher stance against unfair lending practices and a crack-down on alleged red-lining compelled Congress, in 1989, to overhaul the Community Reinvestment Act via the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA). The new amendments brought about sweeping changes. Not only were the numeric grades replaced with qualitative ratings, but the evaluation standards were tightened and examination results made public. A definitional description of each qualitative rating is provided in Table 2-2.

---

[2] Revised CRA regulations, which were adopted in April 1995 and become fully effective July 1, 1997, replace the current system of twelve performance factors with a set of three outcomes based tests: the Lending, Service, and Investment tests. For a more extensive description of the revised regulations, see Johnson and Myers (1996), Teitelbaum (1994), and Teitelbaum and Casanova (1996).

[3] See Macey and Miller (1993).

Table 2-1

CRA Assessment Categories and Performance Factors

I. Ascertainment of Community Credit Needs
    a. Activities conducted by the institution to ascertain the credit needs of its community, including the extent of efforts to communicate with members of its community regarding the credit services it is prepared to offer to the community.
    b. The extent of participation by the institution's board of directors in formulating policies and reviewing the institution's performance with respect to the purposes and intent of the Community Reinvestment Act.

II. Marketing and Types of Credit Extended
    a. The extent of the institution's marketing and special credit-related programs to make members of the community aware of the credit services it offers.
    b. The institution's origination of residential mortgage loans, housing rehabilitation loans, home improvement loans, and small business and small farm loans within its community; the purchase of such loans originated in its community; or other indirect activities aimed at helping meet local community housing, small business, and small farming needs.
    c. The institution's participation in governmentally-insured, guaranteed, or subsidized loan programs for housing, small businesses, or small farms.

III. Geographic Distribution and Record of Opening and Closing Offices
    a. The geographic distribution of the institution's credit extensions, credit applications, and credit denials.
    b. The institution's record of opening and closing offices and providing services at offices.

IV. Discrimination and Other Illegal Credit Practices
    a. Any practices intended to discourage applications for types of credit set forth in the institution's CRA Statement(s).
    b. Evidence of prohibited discriminatory or other illegal credit practices.

V. Community Development
    a. The institution's participation, including investments, in local community development and redevelopment projects or programs.
    b. The institution's ability to meet various community credit needs based upon its financial condition and size, and legal impediments, local economic conditions and other factors.
    c. Any other factors that reasonably bear upon the extent to which an institution is helping to meet the credit needs of its entire community.

Source: Harrison (1998)

Table 2-2
CRA Rating Definitions

"OUTSTANDING"

An outstanding institution is a leader in identifying and addressing the credit needs of its entire delineated community, including low- and moderate-income neighborhoods, in a manner consistent with its resources and capabilities. CRA-related activities are initiated, encouraged, and monitored by top management, are well documented, and represent an integral component of the institution's planning process, procedures, formal policies, and training programs. The institution is in compliance with antidiscrimination laws (including fair lending and fair housing laws), highly involved with community groups and the public sector, and aggressively markets innovative products and services which significantly benefit the community. Outstanding institutions present no supervisory concern in CRA matters.

"SATISFACTORY"

A satisfactory institution exhibits an acceptable record in identifying and addressing the credit needs of its entire delineated community, including low- and moderate-income neighborhoods, in a manner consistent with its resources and capabilities. CRA-related activities occasionally involve top management, are adequately monitored and documented, and are considered and integrated into (although not an integral part of) the institution's planning process, procedures, formal policies, and training programs. The institution is in compliance with the substantive provisions of antidiscrimination laws (including fair lending and fair housing laws), exhibits a reasonable level of community involvement, and markets appropriate products and services which benefit the community. Satisfactory institutions do not present a serious supervisory concern in CRA matters, but may benefit from additional encouragement to expand such efforts.

"NEEDS TO IMPROVE"

A need to improve institution does not adequately identify and address the credit needs of its local community in a manner consistent with its resources and capabilities. Low- and moderate-income neighborhoods may be excluded from the institution's delineated community, while CRA documentation, training, and monitoring activities are inadequate, rarely involve top management, and exhibit specific, identifiable weaknesses. The institution is not in compliance with the substantive provisions of antidiscrimination laws (including fair lending and fair housing laws), has very limited contact with community groups and the public sector, and does little or nothing to develop and/or market unique products and services which would benefit the community

Table 2-2--continued

"SUBSTANTIAL NONCOMPLIANCE" A substantial noncompliance institution exhibits a significantly deficient record of identifying and addressing the needs of its local community in a manner consistent with its resources and capabilities. Low- and moderate-income neighborhoods are unreasonably excluded from the institution's delineated community, while CRA documentation, training, and monitoring activities are rare to non-existent, do not involve top management, and are seldom, if ever, considered within the institution's planning process, policies, or procedures. The institution is in substantial noncompliance with antidiscrimination laws (including fair lending and fair housing laws), has no meaningful contact with community organizations and the public sector, does not advertise (or offer) loan products in line with community needs, and employs restrictive credit policies which contribute to disparate lending patterns. Substantial noncompliance institutions are of significant supervisory concern in CRA matters and require serious attention.

Source: Harrison (1998)

One of the unique aspects of the Community Reinvestment Act has been the enforcement mechanism (or lack thereof). Designed to alleviate bankers' fears concerning governmental credit allocation, the law does not outline specific penalties for non-compliance and, in fact, does not explicitly grant supervisory agencies the authority to enforce its provisions. In practice, however, regulators do have substantial enforcement ability, particularly over holding company banks, as institutions which fail to meet minimum CRA compliance guidelines will find it difficult to gain regulatory approval for any expansions, mergers, takeovers, or acquisitions they wish to pursue.[4] As Jehle (1986) points out, the approval or denial of merger applications is one of the most important functions of bank regulators. This is particularly evident in the rapidly consolidating financial services industry of today.[5]

---

[4] In practice, a poor CRA rating at a single subsidiary bank of a large holding company can derail expansion activities of the entire conglomerate. See also, Teitelbaum (1994) for a detailed analysis of how CRA enforcement has been selectively focused on holding companies.

Documenting the apparent presence and persistence of discrimination against low- to moderate-income individuals, families, and communities, particularly those which are ethnically diverse, has generated a vast array of literature. Unfortunately, most of these studies have implicitly assumed that lenders are cross-sectionally identical, or alternatively, that any inter-bank differences which do indeed exist have no impact on the operating and regulatory environment faced by the firms. The purpose of this paper is to investigate and challenge the validity of these assumptions. Specifically, it is argued that lender attributes, such as their financial position, organizational structure, and community demographics, have a significant impact on the consumer compliance practices an institution chooses to pursue, and the manner in which regulators choose to evaluate such performance. Clearly, observable differences in compliance practices which are related to the unique operating environment of a given institution have significant implications for both public policy and continuing research on discrimination in lending.

The remainder of this chapter is organized as follows: section two provides a brief review of the literature on discrimination in lending, section three introduces the concept of cross-sectional heterogeneity of institutions and outlines the hypotheses to be examined, section four describes the data and procedures to be employed throughout the analysis, section five presents the empirical results, and section six summarizes the major findings and concludes.

---

[5] A more complete description of the legislative history and evolution of the Community Reinvestment Act may be found in Garwood and Smith (1993), Spong (1994), and Moore (1995).

Previous literature

A vast array of literature has been devoted to investigating the equality and distribution of lending outcomes in the mortgage market. This section highlights and summarizes the major findings and implications of this research to date. While all of the following studies provide unique insight into bank lending decisions, it is important to note that virtually all empirical efforts in this area implicitly assume lenders are cross-sectionally identical with respect to their internal operating characteristics and external operating environment. This assumption suggests all institutions collect, process, and evaluate information in an equivalent manner; face the same investment opportunity set and regulatory pressures; and possess identical risk tolerances, preferences, and management capabilities. In the next section it will be argued that this is not necessarily an appropriate assumption.

Numerous studies provide evidence purporting to show discrimination in lending that systematically impedes economic opportunity by race, sex, or income. For example, Bradbury, Case, and Dunham (1989) show that fewer mortgages are originated in black areas (of Boston) than in white areas, and argue this variation cannot be attributed to differences in income, wealth, or traditional measures of neighborhood specific characteristics. Similar results are reported in the widely cited Federal Reserve Bank of Boston study by Munnell, Browne, McEneaney, and Tootell (1996). They found, even after controlling for property specific characteristics, loan to value ratios, and applicant obligation ratios and credit histories, black and Hispanic applicants were significantly more likely than observationally equivalent white applicants to be denied mortgage financing.[6] In addition, they argue other forms of discrimination may exacerbate the problems these groups encounter in obtaining financing. For example, minority applications may be discouraged through an informal, pre-screening process, or white applicants may receive more help and guidance (a.k.a. "coaching") in filling out applications than do their minority counterparts.[7] Differences in educational and labor market opportunities may also pose barriers to non-whites in their attempt to meet traditional credit standards. Finally, "steering" activities on the part of real estate agents may lead minority applicants into regions or property types which are viewed as more risky by prospective lenders, thereby decreasing the probability (and/or increasing the cost) of obtaining financing.[8]

---

[6] Tootell (1997) reports even wider disparities for accept/reject decisions on private mortgage insurance applications.

[7] Benston (1981) also raises the concern that discriminatory behavior will go undetected by traditional studies if it occurs via pre-screening or discouragement of applications, while Walter, Koren, and Sterrett (1994) provide evidence on the disparate impact of coaching.

[8] Steering is the practice by real estate agents of directing or leading clients to neighborhoods with residents fitting a particular demographic profile, usually one similar to that of the client. Galster (1992) and Roychoudhury and Goodman (1996) note this practice can be motivated by prejudice on the part of either the agent or client, or can arise from profit maximizing attempts at price discrimination on the part of the agent. Newburger (1989) also argues that perceptions of prejudice in the market may encourage profit maximizing real estate brokers to undertake discriminatory activities.

Taking a somewhat different approach, Gabriel and Rosenthal (1991) find that non-whites are significantly more likely to rely on FHA rather than conventional financing in obtaining mortgage loans. This result holds after controlling for various measures of borrower default risk, and is robust across household risk classifications and alternative model specifications. The result is disturbing because conventional financing is typically considered a cheaper, and therefore more desirable, source of mortgage funding. Other studies of note in this area include Schafer (1979) who finds blacks pay higher prices than whites for equivalent housing in a given area, and further argues that housing prices are higher in black and transition neighborhoods than in predominantly white areas. Also, Schafer and Ladd (1981) present an array of discriminatory lending outcomes against women, minorities, and single men which appear to be statistically significant, consistent across reporting regions, and persistent through time.[9] Finally, Canner and Smith (1991 and 1992) and Canner, Passmore, and Smith (1994) analyze HMDA data and find disparities among rejection rates for home purchase and improvement loans across income and racial classifications.

Citing this wealth of literature as convincing evidence of discrimination in lending, special interest and community activist groups have continually called for tighter regulation of, and increased enforcement actions against, financial institutions.[10] Several concerns regarding these studies must be addressed and answered, however, before drawing conclusions about discriminatory lending patterns. First, the evidence of discrimination previously cited may be at least partially explained by omitted risk factors. For example, HMDA data do not include key measures of applicant credit-worthiness such as employment prospects and collateral. Berkovec, Canner, Gabriel, and Hannan (1994) provide empirical support for the notion that traditional data sources do not account for all relevant risk factors by showing black households have higher default probabilities than other ethnic households. In addition, Schill and Wachter (1994) point out that when neighborhood risk measures are properly applied to traditional discrimination studies, race effects disappear. For example, Shear and Yezer (1983) find women and minority borrowers are not disproportionately pushed toward FHA borrowing given economic and property characteristics. Finally, Shaffer (1996) illustrates how differential lending outcomes across groupings can result from an "economically nondiscriminatory lending policy."

---

[9] The outcomes and policies evaluated by the authors include differential rejection rates and loan terms across demographic groups, income discounting practices, and baby letter requirements.

[10] The Community Development Banking Act of 1994 may have been passed in response to this type of pressure, also referred to as "regulation from below."

Second, given the disparities in lending outcomes across income and racial classifications, should the government attempt to "cure" the problem by directing banks to take on marginal loans in the under-represented categories? Kane (1977) argues vehemently against such intervention claiming financial regulations turn economic problems and processes into political ones, reduce the efficiency of conflict resolution, and are difficult to remove once they have outlived their usefulness. Furthermore, Teitelbaum (1994) argues the public disclosure requirements may undercut, rather than encourage, the correction of deficient lending patterns. Similarly, Lindsey (1995) argues under served groups may receive more credit from "expert but flawed" humans than from purely objective computers. Thus, there are significant reasons to believe regulations designed to increase the flow of credit to underserved groups and areas may not achieve their desired results.

Finally, and perhaps most importantly, Masulis (1982) argues mortgage markets appear to be extremely competitive based on the large number of lenders and alternative financing sources available within any given area. In a competitive, economically efficient market, it would seem highly unlikely that widespread discrimination could persist.[11] Theoretically, profit maximizing entrepreneurs would step in and exploit the opportunity if traditional lenders failed to meet the financing needs of particular groups or individuals. Therefore, Masulis concludes observed disparities in mortgage lending are most likely attributable to rational decision-making by lenders who act on real or perceived differences in project riskiness not captured in traditional redlining studies.[12] This paper investigates whether the idiosyncratic characteristics of a given lender materially shape this decision-making process.

---

[11] Becker's (1957 and 1971) classic work provides an alternative framework for analysis with similar conclusions. He argues discrimination is a taste which individuals and/or lenders are willing to pay, or forgo income, to satisfy. Lenders with this taste should ultimately be driven out of an efficient market by lenders willing to look past demographic stereotypes and focus on credit quality issues. The conclusion, once again, is that discrimination should decrease as competition within the market increases.

[12] Guttentag and Wachter (1980) argue information costs may explain these disparities, while Lang and Nakamura (1990 & 1993), Nakamura (1993), Ling and Wachter (1998), and Calem (1996) demonstrate how these information costs may arise through the traditional appraisal process. Calem and Wachter (1996) provide evidence that delinquency rates are higher in distressed neighborhoods.

Cross-sectional Variability of Banks and the Effect on CRA Ratings

The banking literature provides numerous reasons for us to believe that banks are not cross-sectionally identical. For example, a recent study by Billett, Flannery, and Garfinkel (1995) highlights the importance of lender quality (reputation) as a determinant of the market's reaction to lending decisions. They argue customer relationships, economies to specialization, and/or reputational factors may precipitate different outcomes for lenders with divergent characteristics. In addition, Bell and Murphy (1969), Jehle (1986), Duca and Rosenthal (1994), and Calem (1996) all argue lender characteristics and the structure and dynamics of local credit markets affect the pricing of banking services and the risk management strategies of lenders within the market. Finally, Benston (1981) highlights the importance of recognizing and controlling for the influences of lender specialization on mortgage market outcomes. Unfortunately, few studies in this area have addressed this concern.

The communities within which financial institutions operate are also unique, and as such, their characteristics may influence the types of customer relationships lending institutions originate and foster. For example, residents in low-income areas may have different credit needs than residents in wealthier areas. To effectively meet the needs of the local customer base, institutions must tailor their product and services offerings, as well as marketing and outreach efforts, appropriately. Applying these ideas of institutional and community heterogeneity to the issue of compliance with Community Reinvestment Act (CRA) provisions produces several interesting and unique testable hypotheses.

First, if compliance with CRA guidelines is costly, financial institutions with more discretionary resources available may be better situated to satisfy the potentially burdensome regulatory requirements. Alternatively, if compliance is relatively costless, and/or if banks can circumvent government regulations in a virtually costless manner, as Black (1975) and Kane (1977) argue, CRA ratings should be independent of the operating characteristics of the institution.

Risk differences among banks may also affect CRA compliance. If a bank is bearing excessive risk, it may need or choose to focus its resources on "safety and soundness" rather than on consumer compliance. This is particularly important if, as Marcus (1984) suggests, banks have an implicit "charter" value to staying in business. Alternatively, Diamond (1989) argues market participants who have developed a valuable reputation will take actions and implement policies to protect this reputation, while Boot, Greenbaum, and Thakor (1993) demonstrate that reputation enhancement increases the probability of receiving future fee income. Together, this suggests banks with strong compliance records may choose to preserve their reputation, regardless of the present financial situation of the firm, in hopes of reaping economic rents in the future.

A final potentially influential internal consideration is the size of the institution. Schill and Wachter (1994) note most large financial institutions have hired full-time community reinvestment officers. This would seem to indicate large banks may have better organized outreach programs specifically designed to help low-income and minority borrowers who don't meet traditional credit standards. If this is the case, these actions should manifest themselves in the form of better CRA ratings for larger institutions. In addition, economies of scale in data collection and processing may make documenting CRA related activities relatively easier at large institutions. Alternatively, if smaller, community banks have a limited customer base which forces them to serve a particular area, or if large institutions are targeted for protest by community groups with limited resources, better CRA ratings should be associated with smaller institutions.[13]

Factors outside of the institution, such as the demographic makeup of the local community, may also play a key role in determining a bank's CRA performance. For example, institutions which operate in communities with a high concentration of low-income residents and/or minorities may need to be more sensitive to compliance measures, as their customer base may be more responsive to, and demanding on, such issues. It seems only logical that residents of a poor, minority inner-city may be more concerned with civil rights compliance issues than residents of a rich, white suburb.

Related to the idea of compliance is the notion of enforcement. With respect to the Community Reinvestment Act, the main tool regulators have employed to enforce its provisions has been their ability to approve or deny mergers, acquisitions, expansions, and takeovers, particularly with regard to multi-bank holding companies. This enforcement approach suggests two things. First, banks with differing growth histories, prospects, opportunities, and ambitions may rationally follow divergent compliance practices. Specifically, banks with significant growth prospects (existing, perceived, or desired), may need to be more sensitive to compliance issues than banks which are satisfied with their current size and market share. Secondly, with different types of institutions evaluated by separate examiners and regulatory agencies, how can we ensure that ratings are consistent across classifications?[14] Clearly, the preceding discussion provides ample justification to question the validity of implicitly assuming lender homogeneity.

---

[13] See Miller (1994) and Johnson and Sarkar (1996) for a detailed description of various size related CRA issues.

Data and Methodology

To examine the determinants of community reinvestment, CRA ratings were collected on all state banks, which were not members of the Federal Reserve system, that were examined for consumer compliance between July 1, 1990 and December 31, 1990. This sample of 1,188 institutions mitigates the potential problem of inconsistent ratings across regulatory agencies, as all banks within the data set were evaluated by the Federal Deposit Insurance Corporation (FDIC).[15] In addition, the six-month interval ensures no institution is examined more than once over the period of study. The ratings were then merged with data from the Federal Financial Institutions Examination Council's Reports of Condition and Income (call reports) covering the structural and financial characteristics of each institution at both the individual bank and holding company level. Specifically, the structural characteristics obtained include the number of domestic branches, whether the bank was minority owned, the number of years since the institution was founded, and whether the bank was part of a (multi-bank) holding company. The financial characteristics obtained include: the capital to asset ratio and total assets of the institution as of December 31, 1989; the growth rates in both total assets and total loans from December 31, 1988 to December 31, 1989; the profitability (ROA) of the institution, net income divided by total assets, for 1989; the level of non-accruing and 90 days or more past due loans as of year end 1989 as a percentage of total assets; and the ratio of cash plus securities holdings to total assets as of December 31, 1989.

---

[14] The Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), and Federal Reserve (FED) all conduct CRA compliance examinations of the institutions they regulate. Burwell and McCarthy (1995) and Moore (1995) examine the issue of differential enforcement practices and conclude ratings do vary systematically across agencies.

[15] Differential enforcement practices across individual examiners within the FDIC remains as a potential source of bias. However, standardized training practices should also mitigate this problem.

After assembling the data set of bank ratings and characteristics, community characteristics were added. Demographic and economic information including the percentage of non-white residents, median household income, median house value, median gross rent, fraction of housing units occupied by the owner, median age of the housing stock, and percentage of residents receiving social security income, retirement income, and public assistance income within the county in which the institution's main office is located were obtained from records of the 1990 United States Census of Population and Housing. Finally, to control for the economic activity of the bank's market area, as suggested by Duca (1994), the per capita dollar value of failed business liabilities for 1989 and the percentage change in per capita failed business liabilities from 1989 to 1990 were collected from Dun and Bradstreet's series on the liabilities of failed firms.

Table 2-3 provides descriptive statistics for each of these variables. Examination of these statistics reveals the vast majority (over 83%) of banks in the sample receive satisfactory ratings (SATIS), about two-thirds are part of a holding company (HOLD), twenty percent belong to multi-bank holding companies (MBHC), very few (only 9) are minority owned (MINOR), and most have few, if any, branches besides their main office (UNITS). The typical institution is relatively small, with both the mean and median total asset size (TASS89) less than \$100 million. This result should not be surprising, however, given the sample criterion of state, non-member banks. Turning to community characteristics, we find the typical county has a five to ten percent minority population (%NONWH), household incomes (MEDINC) in the mid-twenty thousand dollar range, and house values (MEDVAL) roughly double yearly incomes. Approximately seventy percent of homes are occupied by the owner (%OWNOCC), with the average structure being about 30 years old (YRBUILT).

To assess the impact of these characteristics on compliance ratings, an ordered probit model of the following general form, was employed:[16]

$$\textbf{RATING} = f(\textbf{Bank Structure} + \textbf{Bank Financial Position} + \textbf{Community Characteristics} + \epsilon)$$

The intuition behind this specification is relatively straightforward. Banks are periodically evaluated for compliance with civil rights legislation. The rating an institution receives

---

[16] The ability of bank examiners to accurately identify regulatory problems has received limited attention in the banking literature. Wu (1969) finds examiners are reasonably accurate, particularly when dealing with small institutions such as those employed in this sample. Flannery and Houston (1996), on the other hand, find little evidence that regulators create information or identify important regulatory problems before they become known to market investors. For this investigation, it is not important who creates the information, but simply whether examiners can distinguish between various performance levels. The remainder of this investigation assumes the CRA rating an institution receives is an unbiased estimate of its true compliance performance.

Table 2-3

Descriptive Statistics for a Sample of 1188 State, Non-member Banks which were Evaluated for CRA Compliance during the period July 1, 1990 through December 31, 1990.

Variable	Obs.	Mean	Median	Std. Dev.	Min.	Max.
Bank Characteristics:						
OUTST	1188	0.060	0	0.237	0	1
SATIS	1188	0.836	1	0.371	0	1
NEEDS	1188	0.099	0	0.299	0	1
SUBN	1188	0.005	0	0.071	0	1
MINOR	1149	0.008	0	0.088	0	1
AGE	1138	67	74	33.4	7	149
HOLD	1188	0.678	1	0.476	0	1
MBHC	1149	0.204	0	0.403	0	1
UNITS	1149	1.622	0	5.265	0	109
CAPRAT	1148	0.095	0.084	0.053	-0.010	0.893
TASS89	1149	87,586.4	32,241	274,738	2,224	3,849,429
NINC89	1148	566.1	249	3,110.2	-33,601	66,432
ROA	1148	0.007	0.009	0.010	-0.074	0.062
NACC89	1143	0.008	0.004	0.011	0	0.110
PDUE89	1143	0.004	0.001	0.006	0	0.044
LOANGRO	1132	0.092	0.063	0.326	-0.667	7.476
CASHPLU	1149	0.309	0.294	0.155	0	0.889
GROWTH	1132	0.069	0.042	0.201	-0.447	3.021
Community Characteristics:						
%NONWH	1146	0.104	0.050	0.123	0.001	0.779
MEDINC	1146	25,398.81	24,036	6,849.58	10,965	54,283
MEDVAL	1146	57,805.58	45,500	45,025.56	14,999	500,001
MEDRENT	1146	337.59	306	104.03	159	749
%OWNOC	1146	0.711	0.732	0.088	0.179	0.872
YRBUILT	1146	1962	1963	10.12	1939	1983
%SOCSEC	1146	0.303	0.309	0.071	0.082	0.502
%RETINC	1146	0.134	0.132	0.035	0.031	0.294

Table 2-3--continued

Variable	Obs.	Mean	Median	Std. Dev.	Min.	Max.
Community Characteristics--continued						
%PUBAST	1146	0.073	0.064	0.036	0.008	0.259
FBLPP89	1187	202.71	61.41	301.80	3.60	1708.35
CHFBLPP	1187	-29.69	6.20	230.58	-1634.69	643.23

Note: Variable Defininitions

Bank Characteristics:

OUTST	A zero, one dummy variable equal to 1 if the institution receives an "Outstanding" rating, zero otherwise
SATIS	A zero, one dummy variable equal to 1 if the institution receives a "Satisfactory" rating, zero otherwise
NEEDS	A zero, one dummy variable equal to 1 if the institution receives a "Needs To Improve" rating, zero otherwise
SUBN	A zero, one dummy variable equal to 1 if the institution receives a "Substantial Non-compliance" rating, zero otherwise
MINOR	A zero, one dummy variable equal to one if the institution is minority owned, zero otherwise
AGE	The number of years since the institution was founded
HOLD	A zero, one dummy variable equal to one if the institution is part of a holding company, zero otherwise
MBHC	A zero, one dummy variable equal to one if the institution is part of a multi-bank holding company, zero otherwise
UNITS	The number of domestic branches of the bank, excluding the main office
CAPRAT	The capital to asset ratio of the institution as of December 31, 1989
TASS89	The total assets of the institution, as measured in thousands of dollars, as of December 31, 1989
NINC89	The net income of the institution during 1989, as measured in thousands of dollars
BEINI	The net income before extraordinary items of the institution during 1989, as measured in thousands of dollars
ROA	The net income of the institution during 1989, divided by the total assets of the institution as of December 31, 1989.
NACC89	The ratio of total non-accruing loans held by the institution to total assets as of December 31, 1989
PDUE89	The ratio of loans past due 90 days or more and still accruing to total assets as of December 31, 1989
LOANGROW	The growth rate in the total loans of the institution, as measured from December 31, 1988 to December 31, 1989
CASHPLUS	The value of vault cash plus securities holdings of the institution, divided by the total assets of the institution as of December 31, 1989
GROWTH	The growth rate in the total assets of the institution, as measured from December 31, 1988 to December 31, 1989

Table 2-3--continued

Note: **Variable Definitions--continued**

Community Characteristics:

%NONWH	The percentage of non-white residents in the county in which the bank is located, as reported by the 1990 U.S. Census (Hispanics are counted as non-white)
MEDINC	The median household income (in dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census
MEDVAL	The median house value (in dollars), as reported by the owner, for the county in which the bank is located, as reported by the 1990 U.S. Census
MEDRENT	The median gross rent (in dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census
%OWNOCC	The fraction of homes located in the county in which the bank is located, occupied by the owner
YRBUILT	The median year of construction for homes in the county in which the bank is located
%SOCSEC	The fraction of households receiving social security income within the county in which the bank is located
%RETINC	The fraction of households receiving retirement income within the county in which the bank is located
%SOCSEC	The fraction of households receiving public assistance income within the county in which the bank is located
FBLPP89	The per capita dollar value of failed business liabilities for the state in which the institution is located
CHFBLPP	The percentage change in per capita failed business liabilities, measured from 1989 to 1990, for the state in which the institution is located

will be based on its operations since the previous examination.[17] The bank's activities and lending decisions during the evaluation interval are in part determined by the institution's operating condition and characteristics (both internal and external) at the beginning of that interval, as well as the trend in the bank's operating position and condition over time. The empirical results which follow from this framework are presented in the following section.

Results

Are lenders cross-sectionally homogenous with respect to Community Reinvestment Act (CRA) compliance? Based on the subsequent evidence presented here, the answer to this basic question is a resounding no, but the more important issues are whether these inter-bank differences are systematically related to bank characteristics and, if so, how large a factor is heterogeneity in explaining compliance performance?

---

[17] A typical FDIC institution may expect to face a compliance examination every eighteen months. Institutions with a history of compliance problems should expect shorter intervals between exams, perhaps as short as six months.

The Base Case

The first step in addressing these issues is the development of a base case which examines whether basic measures of an institution's operating position and the demographic composition of the bank's local market area are systematically related to the compliance grade the institution receives. Table 2-4 provides base case ordered probit regression results for three alternative evaluation intervals. Column one uses only those institutions evaluated during July 1990, while columns two and three employ institutions evaluated during the third quarter and second half of 1990 respectively. Consistent with expectations, the results provide strong evidence that large banks receive higher compliance ratings than smaller banks. This finding reflects both the stiffer penalties associated with non-compliance for larger institutions, and the greater economies of scale enjoyed by these entities in documenting their CRA related activities. In addition, the evidence provided by CAPRAT suggests the capital to asset ratio is inversely related to an institution's compliance performance. One potential explanation for this finding is that highly capitalized institutions have retained cash flows rather than reinvesting the funds into community development initiatives. This argument is further strengthened by the strongly negative coefficients on the ratio of vault cash plus securities holdings to total assets (CASHPLUS). CASHPLUS is designed to measure an institution's orientation toward retaining funds as opposed to extending credit. As expected, the negative coefficients imply banks with active loan departments, programs, and initiatives are more likely to receive favorable CRA evaluations. Finally, the results also provide weak evidence that banks with higher levels of profitability (ROA), and therefore, more .

Table 2-4
Ordered Probit Results of Regressing CRA Ratings against
Bank and Community Characteristics
(Outstanding=3, Satisfactory=2, Needs to Improve=1, Substantial Non-compliance=0)

Variable	July Exams	3rd Quarter Exams	1990 Exams
Capital-Asset Ratio (CAPRAT)	-2.144 (-0.71)	-2.832 (-1.45)	-4.241 (-3.12)***
Log of Total Assets (LASSET)	0.220 (2.28)**	0.316 (5.38)***	0.302 (6.70)***
Growth Rate of Assets (GROWTH)	0.146 (0.16)	0.325 (0.61)	-0.352 (-1.41)
Return on Assets (ROA)	22.80 (2.04)**	9.813 (1.45)	7.553 (1.55)
Non-accruing Loans (NACC)	15.94 (1.49)	4.183 (0.68)	-4.01 (-1.00)
Past Due Loans (90+ Days) (PDUE)	-2.095 (-0.11)	-17.58 (-1.96)**	-21.11 (-2.94)***
Loan Growth (LOANGROW)	0.162 (0.20)	-0.088 (-0.20)	-0.092 (0.64)
Cash + Securities (CASHPLUS)	-1.518 (-2.12)**	-1.028 (-2.41)**	-1.117 (-3.69)***
Percentage Non-white (%NONWH)	-0.977 (-1.04)	-1.501 (-2.78)***	-1.215 (-3.33)***
Median Household Income (MEDINC)	-0.045 (-2.83)***	-0.047 (-4.97)***	-0.037 (-5.39)***
Breakpoint 1	-2.145	-1.502	-1.689
Breakpoint 2	-0.603	0.186	-0.094
Breakpoint 3	2.288	3.112	2.979
Observations	194	569	1123
Chi-Square (10)	21.30**	63.04***	104.20***
Log Likelihood	-112.93	-322.74	-582.08
(Pseudo) R^2	0.0862	0.0890	0.0822

***	significant at the 99% confidence level
**	significant at the 95% confidence level
*	significant at the 90% confidence level

Note: Variable Definitions

CAPRAT	The capital to asset ratio of the institution as of December 31, 1989
LASSET	The log of the total assets of the institution as of December 31, 1989

Table 2-4--continued

Note: Variable Definitions--continued

GROWTH	The growth rate in the total assets of the institution, as measured from December 31, 1988 to December 31, 1989
ROA	The net income of the institution during 1989, divided by the total assets of the institution as of December 31, 1989
NACC	The ratio of total non-accruing loans held by the institution to total assets as of December 31, 1989
PDUE	The ratio of loans past due 90 days or more and still accruing to total assets as of December 31, 1989
LOANGROW	The growth rate in the total loans of the institution, as measured from December 31, 1988 to December 31, 1989
CASHPLUS	The value of vault cash plus securities holdings of the institution, divided by the total assets of the institution as of December 31, 1989
%NONWH	The percentage of non-white residents in the county in which the bank is located, as reported by the 1990 U.S. Census (Hispanics are counted as non-white)
MEDINC	The median household income (in thousands of dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census

discretionary resources available, are more likely to receive higher compliance ratings.[18] Together, these results indicate the financial position of an institution plays a significant role in shaping the compliance practices and performance of the organization

The community characteristics are somewhat harder to interpret. The negative coefficient on median income (MEDINC) suggests the lower the median income in the area, the more likely the bank will be in compliance with CRA regulations. This implies CRA regulations may be meeting their intended objective of stimulating investment in low- to moderate-income areas. Interestingly, the negative coefficient on the racial composition variable (%NONWH) tells a somewhat different story. As the minority concentration of the local community increases, the probability that an institution will be in non-compliance with CRA provisions increases. The most obvious explanation for this seeming paradox on the effectiveness of CRA regulations, potential collinearity between these explanatory variables, is unlikely to account for the entire discrepancy, as rerunning the regressions with each variable entering individually produces results which are consistent in both sign and magnitude with those reported. At this juncture, a definitive answer to why the signs on %NONWH and MEDINC are identical remains elusive.[19]

---

[18] The results are somewhat stronger when unscaled net income is substituted for return on assets as the measure of profitability, perhaps suggesting a fixed component cost of regulatory compliance.

Does Size Matter?

Should institutional size affect compliance performance? Many industry insiders suggest bank size influences consumer compliance in a variety of ways. First, they argue smaller institutions are constrained by the size of their available customer base. In order to survive, small institutions must take the extra step in providing unique credit services specifically designed to meet the needs of their customers. As the institution grows, its customer base and investment options expand, meaning the bank is no longer forced to rely on outstanding or unique service to its community for survival. This logic implies, at least for reasonably small institutions, that smaller banks should have better reinvestment records than larger banks.

At the other end of the size spectrum, large banks may have more to lose from poor compliance evaluations than small banks do. For example, reputation may be more important to larger institutions, and the potential for lost business and expansion opportunities is certainly greater at bigger banks. In addition, many large lenders have hired full-time community reinvestment officers, a luxury few small banks can afford. These factors would all indicate the bigger the bank, the better the expected compliance performance. Combining these two theories, it is easy to see how the base case specification fails to account for the possibility of a systematic, non-linear relationship between bank size and compliance performance. If both of the above theories are correct, a u-shaped relationship would exist, but could be easily obscured by the linearity constraint of the original model. Alternatively, if economies of scale in data collection and processing allow larger banks to more easily document CRA activities, while simultaneously larger institutions are more likely to face challenges or protests from community based organizations, an inverted u-shaped relationship may exist, but would again be obscured by the base case specification.

---

[19] Several ideas have been offered as potential explanations for this race-income paradox. First, the results are consistent with the Boston Fed's study which finds strong evidence of disparate treatment in mortgage markets. If bankers, as a group, discriminate against racial and ethnic minorities, we would expect to see CRA compliance activities targeted toward low-income white areas. Second, institutions located in areas with very few, if any, minority residents may not have the opportunity to discriminate. Finally, if regulators in minority areas establish higher compliance standards for institutions to satisfy, the observed sign pattern may rationally develop.

After displaying the distribution of compliance grades by institution size, Table 2-5 examines the possibility of a non-linear size-rating relationship through the use of spline regression techniques. Similar to piecewise regression, the spline approach allows the relationship between two variables to change over different regions, or in this case, size categories. The size relationship is estimated after controlling for all base case financial and demographic characteristics of the institution. Table 2-6 provides regression results for the size classifications and evidence of a non-linear relationship obscured in the base case. Specifically, the influence of size is most pronounced both statistically and economically for very small institutions (i.e. those with less than $100 million in assets). Again, this may indicate these banks do not have the necessary resources to meet the unique needs of their customers (or to document such activities), but improve and expand such services (documentation) as more resources become available to them. Size

Table 2-5
Does Size Matter?
Distribution of Exam Grades by Institution Size (measured as total assets, 12/31/89)

	Ratings				
Size	**OUTST**	**SATIS**	**NEEDS**	**SUBN**	**Total number of banks**
Unknown Size	13%	79%	8%	0%	39
$0-$100 million	4%	85%	11%	1%	987
$100-$300 million	18%	74%	8%	0%	115
$300-$500 million	11%	83%	6%	0%	18
Over $500 million	28%	66%	3%	3%	29
Totals	6%	84%	10%	1%	1188

Table 2-6
Does Size Matter?
Spline Regression Results of Size Classifications

Variable	Coefficient	Z-Statistic
$0-$100 million	0.0075	4.32***
$100-$300 million	0.0027	1.74*
$300-$500 million	0.0006	0.27
Over $500 million	-0.0001	-0.18

*** Significant at the 99% confidence level
** Significant at the 95% confidence level
* Significant at the 90% confidence level

continues to play a significant, though somewhat diminished role in the compliance activities of moderately sized institutions ($100 - $300 million), and finally becomes statistically insignificant for large banks.[20]

Structural Considerations

Structural characteristics of an institution, in addition to the aforementioned financial and community characteristics, may also affect compliance issues. For example, recent popular press articles have highlighted (and criticized) the CRA performance of minority owned banks. Are these institutions systematically different from other banks with regard to compliance practices? The results presented in Table 2-7 and Table 2-8 suggest the answer to this question is maybe. After controlling for all the variables in the base case, a dummy variable representing minority ownership status (MINOR) was added to the specification. The regression results presented in Table 2-7, column I, indicate minority owned banks are more likely to receive higher ratings than other banks. This is evidenced by the positive and significant coefficient (z=2.10) on MINOR. Interestingly,

---

[20] It is entirely possible that economies of scale continue to accrue to institutions with total assets in excess of $300 million, with these effects simply offset or obscured as community groups with limited resources target their attention on those banks most likely to make high dollar commitments toward community development. The (insignificant) negative coefficient on the spline variable for institution size in excess of $500 million is consistent with this explanation.

Table 2-7
Analysis of Bank Structure on CRA Ratings
Ordered Probit Results
(Outstanding=3, Satisfactory=2, Needs to Improve=1, Substantial Non-Compliance=0)

Variable	I	II	III	IV	V
MINOR	0.924 (2.10)**				
UNITS		0.0053 (0.61)			
HOLD			0.111 (1.17)		
MBHC				0.170 (1.56)	
BIGMBHC					0.499 (2.91)***
Observations	1123	1123	1123	1123	1123
Chi-Square(11)	108.76***	104.56***	105.57***	106.62***	112.63***
Log Likelihood	-579.79	-581.89	-581.39	-580.86	-577.86
(Pseudo)R^2	0.0858	0.0824	0.0832	0.0841	0.0888

***	Significant at the 99% confidence level
**	Significant at the 95% confidence level
*	Significant at the 90% confidence level

Note: Variable Definitions

MINOR	A zero, one dummy variable equal to one if the institution is minority owned, zero otherwise
UNITS	The number of domestic branches of the bank, excluding the main office
MMKT	A zero, one dummy variable equal to one if UNITS is greater than 0
HOLD	A zero, one dummy variable equal to one if the institution is part of a holding company, zero otherwise
MBHC	A zero, one dummy variable equal to one if the institution is part of a multi-bank holding company, zero otherwise
BIGMBHC	A zero, one dummy variable equal to one if the institution is a member of a holding company whose assets exceed $500 million

Table 2-8
Analysis of Bank Structure on CRA Ratings
Nonparametric Tests

Variable	t-test (means) t	Mann-Whitney Test (medians) z	Kruskal-Wallis Test (populations) χ^2
MINOR	1.18	0.72	0.52
MMKT	3.91***	2.44**	5.94**
HOLD	3.85***	2.47**	6.08**
MBHC	3.59***	2.24**	5.03**
BIGMBHC	5.21***	3.44***	11.81***

***	Significant at the 99% confidence level
**	Significant at the 95% confidence level
*	Significant at the 90% confidence level

Note: Variable Definitions

MINOR	A zero, one dummy variable equal to one if the institution is minority owned, zero otherwise
UNITS	The number of domestic branches of the bank, excluding the main office
MMKT	A zero, one dummy variable equal to one if UNITS is greater than 0
HOLD	A zero, one dummy variable equal to one if the institution is part of a holding company, zero otherwise
MBHC	A zero, one dummy variable equal to one if the institution is part of a multi-bank holding company, zero otherwise
BIGMBHC	A zero, one dummy variable equal to one if the institution is a member of a holding company whose assets exceed $500 million

the t-test and non-parametric measures presented in Table 2-8 reveal no such differences in performance.[21] Before making any sweeping generalizations regarding the compliance performance of minority owned institutions, readers should be cautioned the data set includes only nine such observations.

---

[21] Unreported regression results using a more flexible multi-nomial logit specification, which allows coefficients to vary between different ratings classes, suggest minority owned banks are more likely to receive both “Outstanding” and “Non-compliance” ratings than similar majority owned institutions. Given this result, and the low number of observations within the sample, the failure of the non-parametric tests to detect performance differences is not overly surprising.

Many banks are also structured as holding companies. The primary advantages of holding company status include the facilitation of growth strategies and access to multiple markets for the parent corporation. However, since a poor rating at a single entity within a large holding company can delay, if not derail, expansion plans for the entire conglomerate, the expectation is to see banks which are part of a holding company place more emphasis on satisfying compliance guidelines.[22] Tables 2-7 and 2-8 suggests this may indeed be the case. The regression results presented in Table 2-7, and non-parametric tests presented in Table 2-8, all possess the expected signs and approach (Table 2-7) or exceed (Table 2-8) traditional significance levels, indicating banks operating in multiple markets, particularly those structured as multi-bank holding companies, may well place more emphasis on compliance performance than their unaffiliated and unit bank counterparts. These results underscore the potential influence regulators exert over the system through their ability to hold up mergers and acquisitions in an industry which is rapidly consolidating. The role of regulators is examined further in the next section.

Reputation and Regulatory Effects

Is reputation important? Theoretically, banks may find high compliance grades important in establishing, maintaining, and enhancing the reputation of the institution. With respect to CRA issues, development of a strong reputation may require a significant commitment of institutional resources. However, as Boot, Greenbaum, and Thakor (1993) point out, reputation enhances an institution's ability to generate future fee income from a given market segment. Furthermore, given the increasing role of reputational capital, as emphasized by Greenbaum (1996), banks which value a strong reputation may employ substantially different practices than banks not concerned with public perceptions of community outreach. Institution age is one measure of an institution's reputation. Table 2-9 examines the reputation issue by asking whether older banks perform differently than younger institutions in the area of community reinvestment. The distributional tests

---

[22] Holding company status may also allow smaller institutions to pool resources and share the services of a common CRA officer.

Table 2-9
Nonparametric Tests of the Importance of
Reputation and Regulatory Effects on CRA Compliance Ratings:
Institution Age (Reputation)

Age	t-test (means) t	Mann-Whitney Test (medians) z	Kruskal-Wallis Test (populations) $\chi^2(1)$
Over 30 years	3.11***	1.85*	3.41*
Over 50 years	3.72***	2.31**	5.34**
Over 75 years	2.51**	1.62	2.63
Over 100 years	1.81*	1.12	1.25

*** Significant at the 99% confidence level
** Significant at the 95% confidence level
* Significant at the 90% confidence level

Table 2-10
Nonparametric Tests of the Importance of
Reputation and Regulatory Effects on CRA Compliance Ratings:
City Size (Small Town versus Big City)

Population	t-test (means) t	Mann-Whitney Test (medians) z	Kruskal-Wallis Test (populations) $\chi^2(1)$
Over 50,000	-1.12	-0.65	0.42
Over 100,000	-2.05**	-1.19	1.41
Over 250,000	-2.72***	-1.51	2.27
Over 500,000	-3.92***	-2.18**	4.74**
Over 1,000,000	-3.51***	-2.23**	4.98**

*** Significant at the 99% confidence level
** Significant at the 95% confidence level
* Significant at the 90% confidence level

consistently indicate older banks receive higher ratings, while unreported regression results also consistently support this contention.

One of the primary tools regulators use in assessing an institution's compliance performance is input from members of the local community. Obviously, the larger the community, the greater the potential for input (both good and bad), but also as the size of the community increases, the probability that community activist groups will form and press the compliance issue with regulators increases. In addition, Stigler (1971) notes the expenses incurred generating support for regulation or action are higher in diffused areas or occupations than in concentrated ones. Together, these factors suggest institutions in bigger cities may face higher compliance hurdles than institutions in smaller towns. Table 2-10 presents t and non-parametric tests on the equality of CRA ratings by county size. Unlike Hula (1991), who finds no clear relationship between the size of a metropolitan area and credit availability, the evidence provided in Table 2-10 (and unreported regressions using county size dummies) is generally supportive of the notion that exam grades are lower in big cities than they are in small towns. These results highlight the importance of community based organizations in the enforcement of community reinvestment act provisions.

Does the Composition of the Local Customer Base Matter?

The base case provided limited information regarding the impact of community characteristics on the reinvestment practices of financial institutions. Clearly, the racial composition and median household income of an institution's home county are not the only community characteristics of interest. Measures of the age, value, and condition of the housing stock, as well as age and economic status of area citizens are also of interest. Table 2-11 presents an array of ordered probit regression results of CRA ratings against expanded community characteristics. Each community characteristic is first evaluated independently of all factors except base case measures of the institution's operating characteristics, and then jointly with all other community characteristics (and again, all base case inputs).

Table 2-11

Ordered Probit Results of Regressing CRA Ratings Against Expanded Community Characteristics
(Outstanding=3, Satisfactory=2, Needs to Improve=1, Substantial Non-compliance=0)

Variable	1	2	3	4	5	6
%NONWH	-0.814 (-2.31)**					
MEDINC		-0.033 (-4.85)***				
MEDVAL			-0.0063 (5.29)***			
MEDRENT				-0.0026 (-5.21)***		
%OWNOCC					1.304 (2.49)**	
YRBUILT						0.0060 (-1.43)
%SOCSEC						
%RETINC						
%PUBAST						
FBLPP89						
CHFBLPP						
Observations	1123	1123	1123	1123	1123	1123
Chi-Square(9)	74.58***	93.09***	97.78***	96.81***	75.49***	71.30***
Log Likelihood	-596.88	-587.63	-585.28	-585.77	-596.43	-598.52
(Psuedo)R^2	0.0588	0.0734	0.0771	0.0763	0.0595	0.0562

Note: Variable Definitions

%NONWH	The percentage of non-white residents in the county in which the bank is located, as reported by the 1990 U.S. Census (Hispanics are counted as non-white)
MEDINC	The median household income (in thousands of dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census

7	8	9	10	11	12
					-1.294 (-2.52)**
					-0.054 (-2.54)**
					-0.0037 (-1.84)*
					0.0013 (0.86)
					1.161 (1.30)
					-0.013 (-1.95)*
1.844 (2.94)***					-3.117 (-2.26)**
	-0.631 (0.52)				-0.023 (-0.02)
		2.021 (1.77)*			0.665 (0.35)
			-0.00010 (-0.74)		-0.000025 (-0.15)
				-0.041 (-2.41)**	-0.021 (-1.02)
1123	1123	1123	1123	1123	1123
77.93***	69.53***	72.39***	68.58***	73.66***	117.87***
-595.21	-599.41	-597.98	-602.36	-599.82	-575.24
0.0614	0.0548	0.0571	0.0539	0.0579	0.0929

Note: Variable Defininitions--continued

MEDVAL	The median house value (in thousands of dollars), as reported by the owner, for the county in which the bank is located, as reported by the 1990 U.S. Census
MEDRENT	The median gross rent (in dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census
%OWNOCC	The fraction of homes located in the county in which the bank is located, occupied by the owner
YRBUILT	The median year of construction for homes in the county in which the bank is located
%SOCSEC	The fraction of households receiving social security income within the county in which the bank is located
%RETINC	The fraction of households receiving retirement income within the county in which the bank is located
%PUBAST	The fraction of households receiving public assistance income within the county in which the bank is located

Table 2-11--continued

Note: Variable Defininitions--continued

FBLPP89	The per capita dollar value of failed business liabilities for the state in which the institution is located
CHFBLPP	The percentage change in per capita failed business liabilities between 1989 and 1990 for the state in which the institution is located

Examining the individual results, I find the race-income paradox is again observable in columns I and II. MEDVAL (z=-5.29), MEDRENT (z=-5.21), and %PUBAST (z=1.77), three alternative measures of community wealth, provide results consistent with the MEDINC finding of higher ratings in poorer areas. The positive coefficient on %OWNOCC (z=2.49) and negative coefficient on YRBUILT (z=-1.43) suggest institutions account for traditional neighborhood risk factors within the context of their CRA initiatives. Finally, the percentage change in failed business liabilities per capita (CHFBLPP) is significant providing evidence supporting Duca's call for the inclusion of economic variables in studies of this nature. Examining the joint effects, I again find evidence of the race-income paradox, while MEDVAL and YRBUILT retain their signs, significance, and interpretations. Interestingly, the median rent, percentage of owner occupied housing units, percentage of the population receiving public assistance income, and percentage change in failed business liabilities per person fail to exhibit statistical significance at traditionally accepted levels. This latter result is most likely driven by the high degree of collinearity among the expanded set of demographic characteristics. With the exception of race effects, CRA ratings appear to be generally higher in those areas the legislation was designed to benefit.

Does the Level of Analysis Matter?

Two potential concerns with the results of the previous analysis are the appropriate definition of the bank's local market area and the use of individual bank, rather than holding company, level data. Stolz (1976) was one of the first to question the use of political boundaries, such as the counties employed in the previous section, arguing bank market areas are not co-terminus with such artificial boundaries. Miller (1994) continues the argument, suggesting the "community" an institution serves is particularly hard to define in today's era of consolidation. Fortunately, these potential biases are unlikely to materially influence the results presented above for two main reasons. First, as Jehle (1986) argues, while banking markets are hard to define, use of county level data makes the most sense. Counties are the smallest units for which reliable economic and demographic data are available, and omission of these characteristics represents a more grievous error than the potential for slight mismeasurement of the true market region. Second, an examination of Table 2-12 reveals the vast majority of sample banks operate a very small number of facilities, making gross mismeasurement of the market area unlikely as few sample institutions conduct statewide operations. As expected, unreported regression results indicate the findings for community characteristics are extremely robust for institutions operating up to five facilities (over 92% of sample banks), remain significant to approximately ten units (over 97% of sample banks), and thereafter become unreliable indicators of compliance performance.

A second potential problem with the previous results is the use of individual bank, rather than holding company data. Specifically, Houston, James, and Marcus (1996) find the investment activities of individual banks are more closely related to the cash flows and capital position of their holding company than to their own financial position. Their findings are also consistent with Stein's (1996) argument that hard to value firms, such as bank holding companies, may establish internal capital markets to allocate scarce capital among alternative investments, and suggest the previously estimated model may be misspecified. This possibility is investigated in Table 2-13. The first column replicates the base case results for comparison purposes. Column two then presents the results of substituting holding company characteristics in place of bank level data for those institutions which are members of holding companies, while retaining the individual bank level information for non-affiliated institutions. The results are strikingly similar to those derived using only bank level data, with the only noteworthy differences being an increased significance level for profitability (ROA) and the significance (and sign change) on past due and non-accruing loans. Size continues to exert a strong positive influence on compliance ratings, while the capital to asset ratio, cash plus securities holdings to asset ratio, and demographic variables all remain significantly negative.

Table 2-12
Frequency Tabulation of the Number of Branches, Besides the Main Office, Operated by a Sample of 1,188 State, Non-member Banks, Evaluated for CRA Compliance During the Second Half of 1990

# of Units	Bank Level	Percentage	HC Level	Percentage
0	611	53.2%	559	48.7%
1	253	22.0	234	20.4
2	118	10.3	114	9.9
3	55	4.8	59	5.1
4	24	2.1	29	2.5
5-9	58	5.0	60	5.2
10-24	18	1.6	32	2.8
25+	12	1.0	62	5.4
Not reported	39	---	39	---
Total	1188	100%	1188	100%

Note: HC Level figures replace the number of individual bank branches with the number of branches operated by the entire holding company. For institutions not organized as holding companies, the tabulations remain unchanged from the Bank Level specification.

Column three takes a slightly different approach and reestimates the original model using holding company characteristics for a subsample comprised exclusively of the multi-bank holding companies. The results clearly indicate that firm size continues to play an important role in compliance ratings, but offer little additional insight. While the remaining coefficients in this model are all statistically insignificant, the vast majority carry signs and magnitudes very similar to those estimated under the base case and HC Level specifications. This suggests the small sample of multi-bank holding companies may be too noisy to allow the true relationship between compliance ratings and institutional characteristics to be identified. Finally, some researchers and industry participants argue the actual CRA rating received by an institution is insignificant compared to the distinction

Table 2-13
Ordered Probit Results of Regressing CRA Ratings against Holding Company and Community Characteristics
(Outstanding=3, Satisfactory=2, Needs to Improve=1, Substantial Non-compliance=0)

Variable	Bank Level	HC Level	MBHC's	Compliance
Capital-Asset Ratio (CAPRAT)	-4.241 (-3.12)***	-3.174 (-2.30)**	-7.264 (-1.13)	-4.744 (-1.55)
Log of Total Assets (LASSET)	0.302 (6.70)***	0.200 (6.69)***	0.244 (3.43)***	0.279 (3.38)***
Growth Rate of Assets (GROWTH)	-0.352 (-1.41)	-0.055 (-1.30)	-0.044 (-0.97)	-0.068 (-0.93)
Return on Assets (ROA)	7.553 (1.55)	4.760 (3.49)***	5.573 (0.86)	9.788 (3.25)***
Non-accruing Loans (NACC)	-4.01 (-1.00)	0.00011 (2.03)**	0.00073 (0.49)	0.000090 (0.99)
Past Due Loans (90+ Days) (PDUE)	-21.11 (-2.94)***	---[a]	---[a]	---[a]
Loan Growth (LOANGROW)	-0.092 (0.64)	0.018 (1.15)	0.012 (0.68)	0.017 (0.65)
Cash + Securities (CASHPLUS)	-1.117 (-3.69)***	-0.793 (-2.67)***	0.848 (0.96)	-2.517 (-3.35)***
Percentage Non-white (%NONWH)	-1.215 (-3.33)***	-1.223 (-3.53)***	-1.054 (-1.39)	-2.924 (-3.83)***
Median Household Income (MEDINC)	-0.037 (-5.39)***	-0.034 (-5.23)***	-0.021 (-1.47)	-0.080 (-5.17)***
Breakpoint 1	-1.689	-2.220	0.382	---
Breakpoint 2	-0.094	-0.681	3.514	---
Breakpoint 3	2.979	2.357	---[b]	---
Observations	1123	1129	232	1129
Chi-Square (10/9/9/9)	104.20***	99.78***	40.00***	66.81***
Log Likelihood	-582.08	-594.94	-113.57	-346.84
(Pseudo) R^2	0.0822	0.0774	0.1497	0.0879

Note: The Compliance Model independent variable equals one if the institution received a CRA evaluation of Satisfactory or Outstanding, and zero if the institution received a rating of Needs to Improve or Substantial Non-compliance. Constant = 2.811, (2.86)***

[a] HC level model employs the sum of past due (90+ days) and Non-accruing loans to avoid estimation problems caused by multi-collinearity.

[b] The MBHC model contains only two breakpoints as the dataset contains no observations with substantially non-compliant institutions.

Table 2-13--continued

*** significant at the 99% confidence level
** significant at the 95% confidence level
* significant at the 90% confidence level

of whether or not the bank has achieved at least a satisfactory level of compliance. Column four employs this breakdown (dependent variable=1 if rating ="Outstanding" or "Satisfactory," zero otherwise) to provide further evidence of the importance of lender heterogeneity to compliance activities. Using the HC Level specification, the results are once again strikingly similar to the base case. Firm size and profitability are directly related to the probability of being in compliance, while the capital to asset ratio, cash plus securities holdings to asset ratio, and demographic variables all exhibit inverse relationships. In sum, the key institutional determinants of CRA performance appear to be robust across various levels of aggregation.

Simulations

Having examined alternative factors which may influence Community Reinvestment Act compliance, I now return to the base case to evaluate the magnitude of the rating sensitivity to each of these variables. By "shocking" each explanatory variable independently, and calculating the updated probability of receiving a given rating, factor sensitivities can be constructed. Tables 2-14 and 2-15 provide the results of the analysis using a one standard deviation positive shock in each explanatory variable. Base case variables are initially set at their means in Table 2-14 and at their medians in Table 2-15. Examining the data reveals the estimated base case probabilities of receiving a given rating correspond very closely to the actual distribution of observed ratings. Not surprisingly , ratings also appear to be most sensitive to changes in institution size, capitalization, and the median income level of the local customer base. For each of these characteristics, the one standard deviation shock results in a three to four percent change in the probability of being in compliance. The ratio of cash plus securities holdings to total assets also appears important, with the estimated effect altering compliance probabilities by two to three

Table 2-14
Simulation Analysis of the Sensitivity of CRA Ratings to Changes in the Values of Explanatory Variables:
Initial Values of all Explanatory Variables Set at their Means

Changes in Prob(Rating=______) given a one Standard Deviation Increase in:				
Variable	**Outstanding**	**Satisfactory**	**Needs to Improve**	**Substantial Non-compliance**
CAPRAT	-1.65%	-2.57%	4.05%	0.17%
LASSET	3.82%	0.39%	-4.10%	-0.11%
GROWTH	-0.59%	-0.61%	1.16%	0.04%
ROA	0.74%	0.45%	-1.15%	-0.04%
NACC	-0.38%	-0.36%	0.71%	0.03%
PDUE	-1.01%	-1.22%	2.15%	0.08%
LOANGROW	-0.26%	-0.24%	0.48%	0.02%
CASHPLUS	-1.33%	-1.81%	3.02%	0.12%
%NONWH	-1.17%	-1.50%	2.57%	0.10%
MEDINC	-1.83%	-3.08%	4.71%	0.20%

Note 1: Base Case:Prob(Rating=Outstanding)=4.18%, Prob(Rating=Satisfactory)=86.84%Prob(Rating=Needs To Improve)=8.82%, Prob(Rating=Substantial Non-compliance)=0.17%

Note 2: Variable Definitions

CAPRAT	The capital to asset ratio of the institution as of December 31, 1989
LASSET	The log of the total assets of the institution as of December 31, 1989
GROWTH	The percentage change in the total assets of the institution, as measured from December 31, 1988 to December 31, 1989
ROA	The net income of the institution during 1989, divided by the total assets of the institution as of December 31, 1989
NACC	The ratio of total non-accruing loans held by the institution to total assets as of December 31, 1989
PDUE	The ratio of loans past due 90 days or more and still accruing to total assets as of December 31, 1989
LOANGROW	The growth rate in the total loans of the institution, as measured from December 31, 1988 to December 31, 1989
CASHPLUS	The value of vault cash plus securities holdings of the institution, divided by the total assets of the institution as of December 31, 1989
%NONWH	The percentage of non-white residents in the county in which the bank is located, as reported by the 1990 U.S. Census (Hispanics are counted as non-white)
MEDINC	The median household income (in dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census

Table 2-15
Simulation Analysis of the Sensitivity of CRA Ratings to Changes in the Values of Explanatory Variables:
Initial Values of all Explanatory Variables set at their Medians

Changes in Prob(Rating=________) given a one Standard Deviation Increase in:				
Variable	**Outstanding**	**Satisfactory**	**Needs to Improve**	**Substantial Non-compliance**
CAPRAT	-2.53%	-0.49%	2.93%	0.08%
LASSET	5.45%	-2.64%	-2.76%	-0.05%
GROWTH	-0.89%	0.05%	0.82%	0.02%
ROA	1.09%	-0.27%	-0.80%	-0.02%
NACC	-0.57%	0.05%	0.50%	0.01%
PDUE	-1.53%	-0.04%	1.54%	0.04%
LOANGROW	-0.39%	0.04%	0.34%	0.01%
CASHPLUS	-2.02%	-0.21%	2.17%	0.06%
%NONWH	-1.78%	-0.11%	1.84%	0.05%
MEDINC	-2.81%	-0.71%	3.43%	0.10%

Note 1: Base Case:
Prob(Rating=Outstanding)=6.92%;Prob(Rating=Satisfactory)=87.49%; Prob(Rating=Needs To Improve)=5.51%; Prob(Rating=Substantial Non-compliance)=0.07%

Note 2: Variable Definitions

CAPRAT	The capital to asset ratio of the institution as of December 31, 1989
LASSET	The log of the total assets of the institution as of December 31, 1989
GROWTH	The percentage change in the total assets of the institution, as measured from December 31, 1988 to December 31, 1989
ROA	The net income of the institution during 1989, divided by the total assets of the institution as of December 31, 1989
NACC	The ratio of total non-accruing loans held by the institution to total assets as of December 31, 1989
PDUE	The ratio of loans past due 90 days or more and still accruing to total assets as of December 31, 1989
LOANGROW	The growth rate in the total loans of the institution, as measured from December 31, 1988 to December 31, 1989
CASHPLUS	The value of vault cash plus securities holdings of the institution, divided by the total assets of the institution as of December 31, 1989
%NONWH	The percentage of non-white residents in the county in which the bank is located, as reported by the 1990 U.S. Census (Hispanics are counted as non-white)

Table 2-15--continued

MEDINC	The median household income (in dollars) for the county in which the bank is located, as reported by the 1990 U.S. Census

percent. Based on the magnitude of these factor sensitivities, it is clear that bank-specific characteristics play a significant role in shaping the compliance policies, practices, and performance of financial institutions.

Conclusion

The preliminary evidence reported in this paper is generally supportive of the notion that deviations from "Satisfactory" Community Reinvestment Act ratings can be at least partially explained by bank specific characteristics. These factors include the financial position and organizational structure of the institution, as well as demographic and economic information regarding the bank's local market area. Specifically, I find more profitable banks may have more discretionary resources available to devote to compliance issues, institutions with a history of distributing rather than retaining cash flows receive higher ratings, and bank size affects ratings in a non-linear, inverted u-shaped fashion. Regulators were found to effectively play an important role in enforcing CRA guidelines, as banks within multi-bank holding companies were found to have higher ratings than unaffiliated institutions. Community based organizations may also influence the process, as ratings in big cities, where community groups should be prevalent and easy to form, appear to be lower than ratings in small towns, where community groups should be more difficult to organize. An analysis of expanded community characteristics revealed, with the exception of race, institutions in counties the Community Reinvestment Act was design to benefit typically exhibit higher ratings.

While the results of this study are informative, it is clear that additional work is warranted in this area. First, a satisfactory explanation of the race-income paradox and a better understanding of the size-rating relationship are needed. In addition, the issue of regulator heterogeneity remains largely unexplored. Secondly, banking, particularly for the institutions within this sample, remains somewhat of a localized, or at least regional, industry. As Samolyk (1994) argues, this implies the health of the local/regional economy influences the health of the local banking sector. If institutions which get into financial difficulties, curtail their community reinvestment activities, a circular feedback effect could ensue. Finally, if lender specific characteristics influence the consumer compliance practices of institutions, previous research on discrimination in lending, particularly accept/reject decision models, which assumes lender homogeneity may be biased. If banks with financial or structural impediments to consumer compliance are concentrated (rare) in low-income and minority areas, traditional models may overstate (understate) race effects and the magnitude of lending disparities. Clearly, a large amount of work in this area remains before the true relationship between the consumer compliance practices of financial institutions and their individual operating, structural, and community characteristics can be fully understood.

CHAPTER 3
THE IMPORTANCE OF LENDER HETEROGENEITY IN MORTGAGE LENDING

Introduction

More than five years after the landmark Federal Reserve Bank of Boston study[1] of discrimination in home mortgage markets, debate over the existence, persistence, and economic significance of disparate lending outcomes continues to rage. While numerous studies[2] present evidence of an unequal distribution of credit outcomes across racial, gender, and income categories, many economists believe mortgage markets are relatively efficient, suggesting widespread discrimination should not persist. Furthermore, they argue the observed disparities documented by previous empirical work are the by-product of an omitted variables bias, and any disparities which do indeed exist are the result of an economically efficient and rational decision making process on the part of lenders.[3] The purpose of this paper is to examine the economic significance of one such omitted variable: the identity of the mortgage lender. Specifically, I find the inclusion of lender attributes, such as the size, capitalization, profitability, and specialization of lending institutions significantly enhances the predictive power of accept/reject decision models of home purchase mortgage applications. Furthermore, the inclusion of these characteristics is shown to mitigate the influence of both applicant race and neighborhood racial composition in such models. Finally, the results provide the first multi-period evidence on the existence and economic significance of information externalities in residential mortgage markets.

---

[1] See Munnell, Browne, McEneaney, and Tootell (1992) for the original version or Munnell, Browne, McEneaney, and Tootell (1996) for the published version.

[2] See, for example, Schafer (1979), Schafer and Ladd (1981), Bradbury, Case, and Dunham (1989), Canner and Smith (1991 and 1992), and Canner, Passmore, and Smith (1994).

[3] See, for example, Becker (1957 and 1971), Masulis (1982), and Schill and Wachter (1993 and 1994).

Lender Heterogeneity

Literally hundreds of investigations have been undertaken to evaluate the equality and distribution of mortgage lending outcomes across racial and income categories. Over time, the sophistication of these investigations has grown to include not only the race, sex, and income of the applicant, but also much broader measures of neighborhood risk such as housing stock attributes, detailed demographic profiles, and historic price levels and transactions volume in the subject property's vicinity. Notably absent, however, from the ever-expanding information set employed by previous investigations is any mention of the role and significance lender heterogeneity plays in the mortgage market. Instead, these studies charge ahead implicitly assuming either lenders are cross-sectionally identical with respect to their risk tolerances and preferences, information collection and processing capabilities, and regulatory environment or alternatively, that any differences which do indeed exist are economically insignificant and orthogonal to those characteristics included in their model specifications.

Numerous reasons abound to believe the omission of lender identity may create a potentially serious omitted variables problem. For example, financial researchers and mortgage market participants have long recognized that lenders often choose to specialize in various market niches and typically employ divergent underwriting practices to achieve institutional objectives. Unfortunately, with the exception of recent work by Black, Collins, and Cyree (1997)[4], divergent underwriting practices based on institutional characteristics have been largely ignored in the literature. In addition, Calomiris, Kahn, and Longhofer (1994) suggest the financial strength and capitalization of an institution may influence the underwriting standards employed by the lender. While their argument was originally used to explain the notoriously poor Community Reinvestment Act (CRA) compliance performance of financially constrained minority owned institutions, there is little reason to doubt the proposition's applicability to a broader spectrum of institutions. Finally, Harrison (1997) argues the regulatory environment faced by lenders varies systematically with institutional characteristics. Specifically, the paper argues regulatory effects, in addition to the above mentioned specialization and financial strength arguments combine to encourage lenders with differing characteristics to pursue divergent compliance policies and underwriting practices. Together, these three works suggest the omission of lender characteristics in traditional accept/reject models of mortgage lending may lead to serious biases in identifying the existence and magnitude of lending disparities in home purchase mortgage markets.

---

[4] The authors find bank-specific characteristics used to proxy for historical underwriting standards are significant factors in explaining decisions to accept or reject applications for mortgage financing.

Data and Methodology

To examine the impact of lender heterogeneity on the distribution of credit outcomes, data were assembled from four primary sources. First, information regarding lender decisions to accept or reject applications for home mortgage financing was obtained from loan application registers (LARs) of regulated lenders collected by the Federal Financial Institutions Examination Council (FFIEC) pursuant to the Home Mortgage Disclosure Act (HMDA). These data contain basic information about the borrower and subject property such as the requested loan amount, loan type, loan purpose, property location, and applicant's race, sex, and annual income. In addition, these records indicate whether each application was approved, denied, withdrawn, or closed for incompleteness. Second, information regarding the demographic composition and housing stock attributes of the census tract in which the subject property is located were obtained from summary files of the 1990 United States Census of Population and Housing. Third, information on historic appreciation rates and transactions volume was gleaned from the Florida Department of Revenue's property tax masterfile for Pinellas County (St. Petersburg). Finally, bank-specific characteristics were obtained from FFIEC year-end reports of condition and income (call reports) filed by regulated financial institutions.[5] Descriptive statistics for each of these variables, segmented by lending outcome, are presented in Table 3-1.

---

[5] Lender attributes were obtained for all bank holding company subsidiaries reporting at least twelve home purchase mortgage applications for properties within Pinellas county during one or more sample years. This criterion led to the collection of financial data for twenty-three institutions.

Table 3-1

Descriptive Statistics for Mortgage Loan Applications made in Pinellas County, Florida, 1993-1995

	All Applications		**Accepted Applications**		**Rejected Applications**		**t-test of difference**
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Dependent Variable							
Fraction of Applications Accepted (0/1)	0.6075	0.4883	1.0000	-----	0.0000	-----	-----
Applicant Characteristics							
Income ($)	55,264	59,626	60,578	65,182	46,955	48,559	18.62***
Loan size ($)	83,602	74,714	89,360	78,132	74,691	68,143	16.09***
Race=Black (0/1)	0.0538	0.2256	0.0374	0.1897	0.0792	0.2700	-15.16***
Ethnicity=Hispanic (0/1)	0.0210	0.1434	0.0208	0.1426	0.0214	0.1446	-0.34
Gender=male (0/1)	0.7236	0.4472	0.7259	0.4461	0.7198	0.4491	1.08
Non-conforming loan (0/1)	0.1431	0.3502	0.1204	0.3254	0.1785	0.3830	-13.49***
Neighborhood (Census Tract) Characteristics							
Minority Population Percentage (%)	9.21	15.39	7.68	12.73	11.56	18.53	-20.71***
Minority Population >25% (0/1)	0.0777	0.2677	0.0543	0.2267	0.1139	0.3176	-18.24***
Median Income ($)	35,412	8,867	36,291	8,771	34,051	8,842	20.77***

Table 3-1--continued

	All Applications		Accepted Applications		Rejected Applications		t-test of difference
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
On Public Assistance (%)	3.94	3.22	3.64	2.85	4.41	3.68	-19.55***
High School Graduates (%)	80.12	8.94	81.03	8.52	78.72	9.39	21.23***
Residents Aged 55+ (%)	36.58	13.52	37.23	13.69	35.57	13.19	10.06***
Unemployment Rate (%)	4.46	1.97	4.36	1.86	4.62	2.12	-10.87***
Housing Stock Characteristics							
Median House Value ($)	90,092	40,763	93,401	41,451	84,970	39,129	16.94***
Median Rent ($)	514.04	105.67	521.22	106.15	502.95	103.96	14.14***
Year Built (Yrs.)	1971	9.61	1972	9.39	1970	9.84	16.14***
Owner Occupied (%)	72.27	14.64	73.16	14.33	70.90	15.00	12.65***
Vacant (%)	16.35	9.67	16.36	9.82	16.33	9.43	0.22
Information Variables							
Historic Appreciation Rates (%)	1.34	7.16	1.32	7.19	1.38	7.10	-0.71
Historic Transaction Volume (%)	3.60	1.94	3.77	1.98	3.35	1.85	17.09***

Table 3-1--continued

	All Applications		Accepted Applications		Rejected Applications		t-test of difference
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Lender Characteristics							
Total Assets (000,000's) ($)	14,100	12,000	13,100	12,100	16,300	11,600	-13.71***
Risk-based Capital Ratio (%)	11.36	2.19	11.49	2.44	11.05	1.40	10.21***
Growth Rate of Assets (%)	20.68	52.98	19.43	49.17	23.57	60.75	-3.92***
Net Income (000's) ($)	160,753	164,720	150,970	163,354	183,399	165,660	-9.95***
Return on Assets (%)	1.06	0.41	1.07	0.41	1.06	0.40	0.51
Risk-weighted Assets/Total Assets (%)	66.37	8.90	66.01	9.01	67.19	8.58	-6.70***
1-4 Family Residential Mortgage Loans/Total Assets (%)	26.94	11.50	27.86	10.99	24.83	12.35	13.37***

A close examination of these figures reveals nearly sixty-one percent of the sample home purchase mortgage applications were approved by the prospective lender. In addition, applicant characteristics indicate the typical borrower possessed an annual income of slightly more than fifty-five thousand dollars, and requested an $83,600 loan. Over seventy percent of sample applications were received from men, while African-American and Hispanic applications account for 5.38% and 2.10% of sample applications respectively. Lending institutions within the sample appear relatively large, with a weighted average size in excess of $14 billion; well capitalized, with risk-based capital ratios averaging 11.36%; and generally profitable, with typical ROAs in excess of one percent. Turning to neighborhood and housing stock characteristics, univariate test statistics indicate acceptance rates are inversely related to the minority population concentration, fraction of households on public assistance, and unemployment rate within a given census tract. Conversely, acceptance rates are positively related to the median income, educational attainment, and age[6] of residents within a given region. Properties located in relatively new neighborhoods, characterized by a large proportion of high-priced or owner-occupied housing units also tend to be strong candidates for loan approval. Finally, historic transaction levels, or information effects, appear to positively influence acceptance probabilities.

The data were then used to estimate a standard logit accept/reject decision model of the following general form:

---

[6] In the absence of detailed financial information regarding individual applicants, age is likely to proxy for accumulated wealth.

$$\textbf{ACCEPT} = f(\textbf{Applicant Characteristics + Neighborhood Characteristics} \\ \textbf{+ Information Externalities + Lender Characteristics} + \epsilon)$$

where ACCEPT is a discrete, binary choice variable equal to one if the application was approved by the prospective lender, and zero if the application was denied.[7] To control for the potentially confounding influences created by differing loan purposes, only home purchase applications for single-family, owner-occupied housing units are included in the sample. In addition, applications exhibiting quality or validity edit check error flags were excluded.[8] Finally, since the lender characteristics which serve as the focal point of this analysis should only influence the decision of a lender to accept or reject applications the institution will fund or bear credit risk upon, loans which were originated and sold into the secondary market within the same calendar year are also excluded from consideration.

Applicant Characteristics

Clearly, one of the most fundamental determinants in a lender's decision to approve or deny a mortgage application is the potential borrower's perceived creditworthiness. Theoretically, high income borrowers should exhibit higher debt capacities, and thus higher acceptance rates, ceteris paribus. Similarly, large loan requests would be expected to place larger burdens on the prospective borrower, thus loan size should be negatively related to acceptance rates. In practice, applicant income and loan size are highly correlated, thus complicating the identification and separation of the true effects. The ratio of the requested loan amount to the applicant's annual income (both measured in thousands of dollars) is included in the model specification to control for these effects.

---

[7] In the basic specification, application files which were withdrawn or closed due to incompleteness are considered to be denied by the lender. Similarly, applications which are approved by the lender, but not taken out by the applicant are still considered to have been accepted. Empirical results are not materially affected if these application categories are simply omitted from the analysis. HMDA records also include information regarding loans purchased by an institution. These loans are not included in the analysis.

[8] The FFIEC places edit status flags on HMDA records which appear to violate a series of logical relationships. For example, a loan record would be flagged if the census tract location reported for a subject property did not correspond with the indicated state, county, or MSA.

Dummy variables identifying black, Hispanic, and female applicants were also included in the model specification, providing some insight into potentially disparate treatment received by these applicants. It is important to note, however, that a mortgage applicant's race, ethnicity, and to a lesser extent gender are often correlated with their employment history, stability, and prospects; educational opportunity and attainment; and accumulated wealth and credit history. In the absence of such detailed information concerning the applicants in the present sample, race and ethnicity are likely to proxy for such omitted applicant characteristics. It is important to stress that significant coefficients on the race and ethnicity terms in this model should not be considered conclusive evidence of pervasive racial discrimination in the mortgage market.

Finally, Buist, Megbolugbe, and Trent (1994) report many lenders employ secondary market standards as underwriting guidelines even on loans they hold within the institution's portfolio. These guidelines provide the lender with additional liquidity in the event portfolio rebalancing is required. While the present data set does not allow for the inclusion of loan to value ratios or total obligation ratios, the classic front end ratio can be closely approximated and controlled for.[9] Specifically, monthly payments were estimated for all borrowers assuming a 30-year, fixed rate, fully amortizing, level payment mortgage with a 10% nominal interest rate.[10] A dummy variable (Non-conforming loan) was then constructed taking on the value of one if the estimated monthly mortgage payment exceeded 28% of the applicant's monthly income, and zero otherwise. A strongly negative coefficient is expected for Non-conforming loan.

Neighborhood Characteristics

To address allegations of red-lining by mortgage lenders, both the percentage minority population within the census tract in which the subject property is located and a zero/one dummy variable equal to one if the tract's minority population exceeds 25% of the tract's total population (zero otherwise) are included in the regression specification. Significantly negative coefficients on either variable would be consistent with under-served market segments based upon the area's racial composition. Similarly, the median household income of the tract's residents is included to measure the equality of the distribution of credit outcomes across neighborhood income classifications. In this case, significantly positive coefficients would be consistent with low-income neighborhoods being under served.

---

[9] The absence of appraisal values for subject properties and information on non-mortgage debt obligations for potential borrowers preclude use of the aforementioned ratios.

[10] Results from reestimating the model using dummy variables created from nominal interest rates of 8% and 9% are qualitatively identical to those reported.

In addition to racial and income measures, Schill and Wachter (1994) highlight the importance of controlling for a comprehensive set of additional neighborhood characteristics. Specifically, they find race effects presented in most traditional redlining studies disappear when a broader array of neighborhood risk factors are included in the analysis. Responding to this concern, the initial regression specification is expanded to include not only the tract's racial and income characteristics, but also a detailed demographic profile containing the percentage of the tract's households receiving public assistance income (expected sign negative), the percentage of the tract's residents over age 25 possessing a high school education or the equivalent (expected sign positive), the percentage of the tract's residents fifty-five years of age and older (expected sign positive), and the tract's unemployment rate (expected sign negative). Housing stock attributes were also analyzed including the median house value (expected sign positive) and median rent (expected sign positive) within the tract, the median year houses within the tract were constructed (expected sign positive), the percentage of the tract's housing units occupied by the property's owner (expected sign positive), and the percentage of the tract's housing units which are vacant (expected sign negative).

Information Externalities

An information externality is created when transactions generate information which makes similar transactions in the future less risky. Lang and Nakamura's (1990 and 1993) seminal work provides the foundation for investigating the existence and significance of such phenomenon in home mortgage lending. They argue individual home sale transactions generate information which makes future transactions less risky to lenders. Specifically, they believe a lender's decision to accept or reject an application for mortgage financing is based, in large part, on the point estimate or range of values provided by independent appraisers. Appraisal estimates, in turn, are based on the recent selling prices of comparable units within a given market area. Therefore, in areas with few historic transactions, appraisers will have a relatively difficult time providing a precise estimate of market value, and hence, accept/reject decisions on the part of lenders will be plagued by more uncertainty and characterized by higher rejection rates. If historically low volume areas are correlated with socially sensitive demographic groupings, omission of information variables such as historic sales levels and appreciation rates may lead to the misidentification of lending patterns resulting from economically rational decision making processes on the part of lenders as the presence of irrational "red-lining" .

To date, only two empirical investigations have explicitly addressed information externalities in home mortgage underwriting, both providing moderately supportive evidence for Lang and Nakamura's theories. First, Calem (1996) using a nationwide data set of major metropolitan areas finds information externalities at work across primarily white census tracts. Interestingly, no such externalities can be detected in minority tracts. Ling and Wachter (1998), on the other hand, using data for Dade county (Miami) Florida find strong evidence of information externalites exerting an economically significant influence across all tract groupings. Specifically, they find a one standard deviation positive shock to historic appreciation rates and sales levels increases the probability of acceptance on home mortgage applications by 3-4 percent, with applications in minority neighborhoods being more sensitive to such information. Interestingly, both studies employ data exclusively from 1990, a period of economic recession (particularly in real estate markets) during which Lang and Nakamura hypothesize information effects should be most pronounced. The results from the current analysis will provide the first multi-period evidence on the existence, persistence, and economic significance of information externalities in home mortgage lending.

To control for these potential influences, two variables were added to the model specification. First, the department of revenue data were geocoded and cleaned using the Gatzlaff and Ling (1994) methodology. Median house price indices were then constructed and 3-year historic, geometric appreciation rates were calculated and included in the model specification. Transaction volumes within each tract were also derived, with the sum of historic sales volumes over the previous 3 years, scaled by the number of owner-occupied housing units within the tract, included in all regressions. The information externality hypothesis would predict positive signs for the coefficients on both of these variables.

Lender Characteristics

To evaluate the importance of lender identity on the home mortgage underwriting process, six institutional attributes designed to measure the financial condition and operating position of prospective lenders were included in the accept/reject model specification. First, to address the issue of lender specialization, the ratio of 1-4 family residential mortgage loans to total assets was added. Banks specializing in mortgage lending will exhibit high ratios and may exhibit high acceptance rates if experience or economies of scale in data processing and collection facilitate the profitable funding of mortgage loans. Alternatively, if specialization is achieved through marketing efforts designed exclusively to increase the size of the applicant pool, this ratio may be unrelated to acceptance rates.[11] Second, Calomiris, Kahn, and Longhofer (1994) argue undercapitalized institutions may fund fewer loans. To account for the possibility of such a relationship, each institution's risk-based capital ratio is included in the analysis. If the CKL hypothesis is correct, a positive relationship between capitalization and acceptance rates should be observed.

Differing risk tolerances and preferences across mortgage lenders may also influence underwriting practices. To investigate this possibility the ratio of the lender's risk-weighted assets to total assets is included in the model specification. Mortgage lenders who are willing and able to assume higher risk levels would be expected to exhibit higher acceptance rates, as they should be more willing to fund marginal loans (such as those not conforming to secondary market standards) in attempts to generate additional fee income.

Size effects may also alter the dynamics of mortgage underwriting, particularly through the regulatory process. Flannery and Houston (1996) argue bank size may affect regulatory treatment on a variety of issues, while Harrison (1997) finds institutional size is positively related to an institution's CRA compliance performance. The natural log of the lending institution's total assets, as well as the growth rate in total assets, are thus included in the model to investigate the potential for regulation induced size effects.[12] Finally, to analyze the importance of institutional efficiency and profitability on acceptance rates, the institution's return on assets for the previous year is included in the analysis. In the absence of discrimination or other market imperfections, as lenders reach more deeply into the applicant pool, the expected risk adjusted return should monotonically decrease.[13] Therefore, in an efficient market we would expect profitability to be inversely related to acceptance rates. Alternatively, if bank examiners employ a pecking order theory of regulation in which institutions are first required to meet safety and soundness goals, and then forced to invest in community reinvestment initiatives, profitability may be directly related to acceptance rates. Given the conflicting expectations of these alternative hypotheses, the expected sign on institutional profitability is left as an empirical question. In the next section, the economic significance of each of these lender characteristics will be analyzed, as well as their joint effect on the other model parameters.

---

[11] In the extreme, it is possible that efforts to increase the size of the applicant pool will lead to a dilution in the creditworthiness of prospective borrowers, and thus, a negative relationship between acceptance rates and specialization.

Empirical Results

Table 3-2 presents results from the accept/reject model of home purchase mortgage applications under three alternative model specifications. The first column presents results from a naive HMDA model which incorporates only the applicant

---

[12] The ability of large, multi-bank holding companies to pool loans from various subsidiary banks and thus geographically diversify its loan pool also suggests a positive relationship between bank size and acceptance rates.

[13] Note, rational investors will undertake their most profitable opportunities first, moving on to less profitable alternatives as time and resources permit.

Table 3-2
Logit Regressions Explaining Loan Acceptance and Simulation of Percentage Change in Probability of Acceptance for Home Purchase Mortgage Applications made in Pinellas County, Florida during 1993-1995

VARIABLE	Model 1	Model 2	Model 3	Simulation
Constant	0.500 (8.00)***	-11.719 (-3.56)***	-19.829 (-3.47)***	-----
Applicant Characteristics				
Loan-to-Income Ratio	-0.039 (-1.15)	-0.038 (-1.14)	-0.042 (-1.59)	-1.64%
Race=Black	-0.491 (-7.04)***	-0.502 (-7.11)***	-0.403 (-3.22)***	-8.27%
Ethnicity=Hispanic	-0.097 (-1.10)	-0.078 (-0.88)	0.160 (1.00)	2.89%
Gender=male	-0.051 (-1.72)*	-0.071 (-2.37)**	0.026 (0.53)	0.49%
Non-conforming loan	-0.422 (-5.75)***	-0.424 (-5.81)***	-0.390 (-4.79)***	-7.99%
Neighborhood (Census Tract) Characteristics				
Minority Population Percentage	-0.013 (-9.59)***	-0.0085 (-2.98)***	-0.0023 (0.48)	-0.68%
Minority Concentration >25%		-0.035 (0.32)	0.0016 (0.01)	0.03%
Median Income		0.0044 (0.92)	0.0042 (0.05)	0.07%
On Public Assistance		1.405 (1.45)	2.124 (1.33)	1.26%
High School Graduates		0.676 (1.82)*	1.136 (1.81)*	1.86%
Residents Aged 55+		0.618 (4.66)***	1.067 (4.73)***	2.61%
Unemployment Rate		1.506 (1.65)*	1.097 (0.73)	0.40%
Information Variables				
Historic Appreciation Rates	0.018 (0.10)	0.386 (1.96)**	0.718 (2.14)**	0.95%

Table 3-2--continued

VARIABLE	Model 1	Model 2	Model 3	Simulation
Historic Transaction Volume	8.536 (11.64)***	4.908 (4.42)***	6.072 (3.07)***	2.14%
Housing Stock Characteristics				
Median House Value		0.0031 (3.21)***	0.0032 (1.92)*	2.39%
Median Rent		-0.00033 (-1.72)*	-0.00017 (-0.51)	-0.33%
Year Built		0.0056 (3.34)***	0.011 (3.81)***	1.94%
Owner Occupied		0.232 (1.60)	0.194 (0.78)	0.53%
Vacant		-0.464 (-2.14)**	-0.363 (-0.98)	-0.66%
Lender Characteristics				
Log of Total Assets			-0.164 (-6.32)***	-4.56%
Risk-based Capital Ratio			-0.047 (-1.51)	-1.99%
Growth Rate of Totals Assets			-0.120 (-2.32)**	-1.22%
Return on Assets			-1.772 (-0.17)	-0.13%
Risk-weighted Assets/Total Assets			-0.605 (-1.64)*	-1.02%
1-4 Family Residential Mortgage Loans/Total Assets			2.912 (8.55)***	5.75%
Number of Observations	25,568	25,480	10,564	10,564
χ^2(8/19/25)	632.09***	777.85***	663.83***	-----
Pseudo R^2	0.0215	0.0256	0.0587	-----
Log Likelihood	-16,568	-16,445	-5911	-----

Note: *** Significant at the 99% level; ** Significant at the 95% level;
* Significant at the 90% level

characteristics, neighborhood minority population percentage, and information variables. As expected, the measure of Non-conforming loans is highly significant and negatively related to acceptance probabilities. The loan-to-income ratio also exhibits a negative coefficient, but is surprisingly insignificant under this model specification. Interestingly, male applicants are consistently less likely to be approved for home mortgage financing, under this basic model specification, than their female counterparts. In addition, the race of both the applicant and of the census tract appear highly significant, with black applicants and applications for properties in minority neighborhoods being accepted less often. Again, recall that the applicant race variable likely proxies for a variety of missing applicant characteristics, such as wealth, employment prospects, and credit history, and should not be taken as conclusive evidence of pervasive racial discrimination in the mortgage market. Finally, turning to the information variables, previous sales levels, but not appreciation rates, exhibit a significantly positive relationship with acceptance probabilities. This result provides further evidence in support of Lang and Nakamura's information externalities hypothesis.

The second column expands the initial specification to include a broader array of neighborhood (tract level) demographic characteristics as well as information regarding the area's housing stock attributes. Similar to the naive specification, loan-to-income and front end ratios are typically important determinants in, and negatively related to, the lender's underwriting decision. Female borrowers continue to receive more credit than their male counterparts, while black applicants continue to receive less. The neighborhood racial composition variable remains negative across this model specification, however, with the inclusion of the expanded information set, the magnitude and significance level are markedly reduced. The expanded neighborhood characteristics suggest both the percentage of tract residents who are high school graduates and the percentage of tract residents who are fifty-five years of age or older tend to positively influence acceptance rates. This result is consistent with expectations as the two variables are designed to capture educational attainment and accumulated wealth respectively. With the exception of the median rental value within the tract, housing stock attributes exhibit the expected signs. Specifically, applications for houses located in younger and higher priced neighborhoods appear more likely to be approved. In addition, owner-occupancy rates appear positively related to acceptance rates, while a high proportion of vacant structures within the area detracts from the probability of acceptance. Turning again to the information variables, appreciation rates now appear significant and positively related to acceptance probabilities, while the inclusion of the expanded information set moderately reduces the magnitude of the transaction volume coefficients. Historic sales levels remain highly significant even after the inclusion of these neighborhood attributes.

Finally, column three adds the lender characteristics. Results indicate, financial institutions specializing in mortgage lending accept a significantly higher percentage of home purchase mortgage applications, as evidenced by the positive coefficient on the ratio of 1-4 family residential mortgage loans to total assets. This suggests economies of specialization (or economies of scale in data collection and processing) may accrue to mortgage lenders. In addition, large banks tend to have lower acceptance rates than small community banks, as evidenced by the strongly negative coefficients on the size variables (log of total assets and growth rate of total assets). Interestingly, institutional risk exhibits a significantly negative relationship with acceptance rates. One explanation for this finding is banks currently possessing a relatively risky portfolio of assets may be hesitant to reach deeply into the applicant pool. Finally, institutional capitalization and profitability do not appear to influence accept/reject decisions.

Clearly, the evidence discussed above provides ample justification to warrant the inclusion of lender characteristics in mortgage market models. However, the most compelling case for their relevance comes from examining the effect of their inclusion on other model parameters. Specifically, inclusion of the bank-specific characteristics dramatically decreases the magnitude, and eliminates all remaining significance, of the tract's minority population percentage. Thus, previous studies which fail to account for differing underwriting practices and policies across mortgage lenders may well be overstating potential disparities in credit market outcomes. Specifically, previous studies may have erroneously identified "red-lined" areas in some situations where they do not indeed exist. Similarly, once lender attributes are added to the model specification, the disparate treatment suffered by men under both previous model specifications disappears. On the other hand, the inclusion of lender identity enhances the magnitude and significance of the information variables. Specifically, the magnitude of the relationship between historic appreciation rates and acceptance probabilities is nearly doubled, while the influence of historic transactions volume jumps over percent. Both coefficients remain highly significant after the inclusion of institutional attributes, suggesting previous empirical investigations into the existence of information externalities may have (significantly) understated their true effects. The results presented in column three provide strong evidence supporting the inclusion of lender characteristics in models of the home mortgage underwriting process.[14]

Simulations

The importance of including lender characteristics in accept/reject models is further evidenced through the use of logistic simulations. The fourth column in Table 3-2 presents simulated effects results estimated by shocking each continuous independent variable one (positive) standard deviation, and calculating the expected change in the probability of acceptance from a base case scenario. For example, consider two prospective buyers who are observationally equivalent except for a one standard deviation difference in their loan-to-income ratios. The higher income (lower ratio) borrower has a 1.64% greater probability of gaining loan approval. For each dichotomous characteristic, the reported results are based on the estimated change in acceptance probability given either the presence or absence of the characteristic. For example, a borrower applying for a non-conforming loan has an 7.99% lower probability of being accepted than a nonconstrained borrower applying for a loan on the same property. Base case results used for comparison purposes are estimated using model 3 with all continuous variables set at their means and all dichotomous variables, except gender=male, set at zero. The base case probability of acceptance is 74.99%. Note, this simulated acceptance probability is slightly higher than the actual observed acceptance rate of 69.83%, primarily due to setting dichotomous variables at zero rather than their sample means.

---

[14] One potential explanation for the observed significance of lender characteristics is that the presence or absence of each attribute may facilitate the "purchase" of discrimination. The present data do not support such an explanation, as dividing the observations into quartiles for each attribute fails to produce any evidence of race effects within classifications. Similarly, estimating the model individually for each sample institution fails to identify a pattern of race effects correlated with institutional characteristics. Alternatively, some researchers may argue bank characteristics are highly collinear with socially sensitive variables, and their inclusion simply masks the truly discriminatory behavior occurring in the mortgage market. Variance Inflation Factors do not support this hypothesis, however, as the maximum VIF for any institutional attribute in model three is only 2.00, while the average VIF across all six characteristics is only 1.66. These values are both well below generally accepted problem indicator levels.

Analysis of the results for each lender characteristic reveals these attributes are economically, as well as statistically, significant. For example, growth rates and risk levels alter acceptance probabilities by over one percent, while differences in capitalization vary acceptance rates by nearly two percent. Institutional size and specialization exert even larger influences, altering acceptance probabilities by 4.56 and 5.75 percent respectively. A similar analysis of the information variables again reveals economically significant effects. While the reported magnitudes are somewhat smaller than the 3-4% effects reported by Ling and Wachter (1998), they remain important, ranging from 0.95% for historic appreciation rates to 2.14% for historic transactions volume. Clearly, accept/reject decision models which ignore the potential influence of either lender characteristics or information externalities suffer from an economically significant omitted variables problem.

Cluster Analysis

One problem with the previous analysis is the potential mismeasurement of tract level demographic characteristics and housing stock attributes. While the mortgage applications in the present sample range in time over the 1993-1995 period, information derived from census data were collected and reported exclusively in 1990. Shifts in these locational characteristics over time will not be captured by, or incorporated into, the preceding model, thus introducing (potentially significant) noise into the analysis. If the shifts are relatively small and gradual over time, the amount of noise introduced into the analysis may be mitigated through the use of cluster analysis.

Cluster analysis groups the census tracts into clusters, or neighborhoods, possessing similar characteristics. The present sample was divided into ten such clusters, which together account for over 94.9% of the variation in the tract level demographic and housing stock attributes.[15] Dummy variables were then created identifying which cluster each mortgage application fell into. Table 3-3 shows the majority of both census tracts and applications fell into cluster one. Cluster one is characterized by middle income applicants, moderately priced homes, a relatively large rental market, and an average minority population of just over seven percent. Cluster two is characterized by low-income applicants, older and lower priced homes, and an average minority population of over thirty-one percent. Clusters three through ten all stratify higher income borrowers and neighborhoods. Of these remaining neighborhoods, only cluster seven (at 3.14%) exhibits an average minority population in excess of three percent.

---

[15] Average linkage clustering, developed by Sokal and Michener (1958), was used to group the data. See also SAS/STAT (1989) for a detailed description of implementing cluster analysis.

Table 3-3
Distributional Analysis of Clustering Procedure

		# of Applications				semipartial R-Squared
Cluster	**# of Tracts**	**1993**	**1994**	**1995**	**Total**	
1	80	3,119	3,734	3,929	10,782	0.263
2	43	916	1,335	1,373	3,624	0.363
3	36	2,131	2,569	2,504	7,204	0.223
4	14	925	989	1,033	2,947	0.004
5	5	285	390	339	1,014	0.016
6	2	389	414	402	1,205	0.024
7	2	37	48	30	115	0.052
8	2	106	125	122	353	0.002
9	1	127	125	149	401	0.002
10	1	25	92	55	132	0.004
Totals	186	8,060	9,781	9,936	27,777	0.949

Table 3-4 presents the results from substituting the neighborhood cluster variables for the demographic and housing stock attributes in the accept/reject model. Surprisingly, little change in the magnitude and significance of either the applicant or lender characteristics is observable. More noticeable and consistent changes are identified, however, for the information variables. While the relationship between historic appreciation and acceptance rates remains relatively unchanged, the magnitude of the sales level variable increases nearly forty percent. This increased influence brings the estimated magnitudes of the joint information effects in line with Ling and Wachter's aforementioned 3-4% estimates. Curiously, information effects for 1993 are slightly reduced by the cluster specification, with estimated information effects lagging behind at roughly 1%. Clearly, the use of cluster analysis provides additional evidence concerning the economic importance of information externalities in home purchase mortgage markets..

Coaching

One widely accepted explanation for observed lending disparities in mortgage markets is the potentially disparate impact of "coaching" across racial and income classifications. Munnell, Browne, McEneaney, and Tootell (1992) suggest white applicants may receive more help and guidance from loan officers during the application process than do their minority counterparts, while Walter, Koren, and Sterrett (1994) provide empirical evidence of such disparities. In the context of the present sample, less than marginally qualified applicants, who would clearly be denied funding after a comprehensive review of their files would be well served to withdraw their applications before the costly review and appraisal process are completed. Therefore, if loan officers provide differential guidance and coaching to applicants along individual or neighborhood racial, gender, or income classifications, the results should manifest themselves in the form of differential application withdrawal probabilities.

Table 3-4

Logit Regressions Explaining Loan Acceptance Probability for Home Purchase Mortgage Applications made in Pinellas County, Florida during 1992 - 1995

VARIABLE	1993	1994	1995	1992-1995
Constant	5.853 (2.35)**	-3.545 (-1.42)	-224.30 (-1.60)	3.678 (5.98)***
Applicant Characteristics				
Loan-to-Income Ratio	-0.137 (-3.07)***	-0.014 (-0.35)	-0.044 (-0.76)	-0.051 (-2.00)**
Race=Black	-0.782 (-3.88)***	-0.573 (-3.55)***	-0.539 (-2.79)***	-0.566 (-5.45)***
Ethnicity=Hispanic	-0.044 (-0.14)	-0.104 (-0.39)	0.336 (1.28)	0.109 (0.68)
Gender=male	0.067 (0.73)	0.064 (0.78)	-0.049 (-0.55)	0.035 (0.70)
Non-conforming loan	-0.343 (-2.41)**	-0.454 (-3.42)***	-0.366 (-2.15)**	-0.378 (-4.60)***
Neighborhood (Census Tract) Clusters				
Cluster Two	-0.245 (-1.72)*	-0.366 (-3.12)***	-0.327 (-2.41)**	-0.286 (-3.89)***
Cluster Three	0.224 (2.13)**	0.084 (0.84)	-0.194 (-1.90)*	0.036 (0.62)
Cluster Four	0.404 (2.72)***	0.244 (1.65)*	-0.106 (-0.72)	0.182 (2.18)**
Cluster Five	0.561 (2.22)**	0.148 (0.74)	0.319 (1.31)	0.319 (2.46)**
Cluster Six	0.599 (2.33)**	-0.060 (-0.25)	0.273 (0.96)	0.243 (1.65)*
Cluster Seven	0.523 (0.81)	0.769 (1.02)	1.236 (1.15)	0.735 (1.66)*
Cluster Eight	0.013 (0.04)	-0.007 (-0.02)	1.464 (2.65)***	0.327 (1.54)
Cluster Nine	0.356 (0.67)	1.067 (2.37)**	0.815 (1.88)*	0.812 (3.33)***

Table 3-4--continued

VARIABLE	1993	1994	1995	1992-1995
Information Variables				
Historic Appreciation Rates	0.099 (0.14)	0.781 (1.29)	2.019 (2.62)***	0.752 (2.13)**
Historic Transaction Volume	4.225 (1.44)	8.950 (3.51)***	10.04 (3.95)***	8.238 (5.52)***
Lender Characteristics				
Log of Total Assets	-0.144 (-2.48)**	-0.078 (-1.11)	2.425 (1.59)	-0.165 (-6.93)***
Risk-based Capital Ratio	-0.184 (-1.73)*	0.134 (1.33)	4.65 (1.44)	-0.049 (-1.61)
Growth Rate of Totals Assets	-0.318 (-2.85)***	-0.943 (-4.25)***	-14.60 (-1.78)*	-0.124 (-2.59)***
Return on Assets	-4.642 (-0.25)	-39.55 (-1.68)*	-2,265 (-1.70)*	-2.852 (-0.32)
Risk-weighted Assets/Total Assets	-1.685 (-1.66)*	5.632 (4.66)***	185.77 (1.68)*	-0.624 (-1.88)
1-4 Family Residential Mortgage Loans/Total Assets	2.660 (3.29)***	4.234 (5.26)***	139.1 (1.72)*	2.877 (9.69)***
Number of Observations	3,353	4,042	3,169	10,564
$\chi^2(21)$	194.17***	314.12***	305.93***	675.97***
Pseudo R^2	0.0501	0.0671	0.0770	0.0538
Log Likelihood	-1,839	-2,184	-1,833	-5,941

Note: *** Significant at the 99% level
** Significant at the 95% level
* Significant at the 90% level

To investigate this possibility, a dependent variable equal to 1 if the mortgage application was withdrawn by the prospective borrower, and zero if the application was denied by the lender was substituted into the model specification. The results, which are presented in the first column of Table 3-5, indicate black applicants, and applicants with payment-to-income ratios in excess of twenty-eight percent receive poor advice, or less coaching, as fewer applications from these borrower pools are withdrawn.[16] On the other hand, borrowers in wealthier areas appear to receive marginally higher levels of coaching, as evidenced by the significant coefficients on median rent and fraction of tract residents fifty-five years of age or older. Highly profitable institutions, which specialize in mortgage lending experience higher withdrawal rates. Lenders with high risk tolerances or preferences experience fewer withdrawals. While differential coaching practices receive far less attention than disparate rejection rates in the mortgage lending literature, their impact is similar: an unlevel playing field for prospective borrowers based on characteristics other than their underlying willingness and ability to pay.

Strategic Behavior

An additional, potentially confounding influence on results of previous accept/reject studies is strategic behavior, or window dressing, on the part of regulated financial institutions. Evanoff and Segal (1997) argue lenders face perverse incentives to appease regulators and improve public perceptions of their lending and community reinvestment activities at the expense of strict adherence to the spirit of mortgage lending regulations. In the present context, this implies lenders may choose to strategically alter their reported acceptance rates by selectively closing application files (for example, due to subjective measures of incompleteness) rather than simply denying mortgage funding.[17] For example, racial red-lining could be disguised by closing, rather than denying, applications made by minority borrowers or for properties in minority areas. Similarly, poor lending rates in low-income areas or to low-income borrowers could be covered-up using the same procedure. Column two of Table 3-5 investigates the possibility of window dressing by substituting a dependent variable equal to one if the application was closed for incompleteness, and zero if the application was denied by the lender, into the previously established model specification. The results provide only very weak evidence of its usage in this context. While women and Hispanic applicants are marginally more likely to have their applications closed, black applicants and applications on properties located in minority neighborhoods do not exhibit higher closure rates. The inconsistency of these results suggests strategic behavior to window dress acceptance rates across racial and income classifications is not a widespread market phenomenon.

---

[16] An alternative explanation for the observed withdrawal pattern is that highly qualified applicants "shop" for the best loan terms. Once they've identified their optimal financing arrangement, applications are withdrawn from all remaining institutions. This explanation is unlikely to account for the entire discrepancy, however, as cutting the data set at alternative income levels (including fifty, seventy-five, and one-hundred thousand dollars) indicates the existence of disparate coaching within the low-income, but not high-income segments.

Access to Credit Markets

Finally, advocates of continuing and expanded governmental intervention in the mortgage market may summarily dismiss the preceding results, arguing they are irrelevant in the absence of equal access to the credit system. For example, Benston (1981) and Munnell, Browne, McEneaney, and Tootell (1992) maintain that if low-income and

---

[17] This form of window dressing will not influence the results of the current study as closed application files were considered to be denied by the prospective lender.

Table 3-5

Logit Regressions Explaining Strategic Behavior in the Market for Home Purchase Mortgages in Pinellas County, Florida during 1992 - 1995

(Application Withdrawn by Applicant=1, Denied by Lender=0)

VARIABLE	Withdrawn	Closed	Not Accepted
Constant	-11.59 (-0.96)	1.412 (0.10)	-0.821 (-0.07)
Applicant Characteristics			
Loan-to-Income Ratio	-0.040 (-0.82)	-0.023 (-0.40)	-0.115 (-1.71)*
Race=Black	-0.756 (-2.79)***	-0.081 (-0.28)	0.100 (0.37)
Ethnicity=Hispanic	0.409 (1.19)	0.704 (1.96)*	0.127 (0.44)
Gender=male	0.092 (0.87)	-0.271 (-2.38)**	-0.088 (-0.91)
Non-conforming loan	-0.318 (-1.84)*	-0.310 (-1.40)	0.098 (0.53)
Neighborhood (Census Tract) Characteristics			
Minority Population Percentage	-0.010 (-1.03)	0.0023 (0.20)	0.004 (0.44)
Minority Concentration >25%	0.209 (0.58)	-0.497 (-1.18)	-0.123 (-0.36)
Median Income	0.00001 (0.69)	0.0028 (0.13)	0.0088 (0.55)
On Public Assistance	4.393 (1.34)	8.305 (2.29)**	1.253 (0.41)
High School Graduates	1.081 (0.82)	3.855 (2.56)**	-2.015 (-1.74)*
Residents Aged 55+	0.881 (1.84)*	0.578 (1.00)	-0.274 (-0.64)
Unemployment Rate	1.739 (0.54)	-8.739 (-2.31)**	-1.398 (-0.49)
Information Variables			
Historic Appreciation Rates	1.128 (1.64)	0.198 (0.23)	-0.784 (-1.31)

Table 3-5--continued

VARIABLE	Withdrawn	Closed	Not Accepted
Historic Transaction Volume	7.568 (1.84)*	-2.879 (-0.53)	-5.301 (-1.40)
Housing Stock Characteristics			
Median House Value	0.00088 (0.24)	-0.0038 (-0.80)	0.0015 (0.48)
Median Rent	0.0016 (2.16)**	-0.0010 (-1.13)	-0.0010 (-1.54)
Year Built	0.0040 (0.65)	0.00075 (0.10)	0.0044 (0.75)
Owner Occupied	-0.324 (-0.64)	0.894 (1.48)	-0.651 (-1.36)
Vacant	0.957 (1.21)	1.325 (1.42)	0.540 (0.78)
Lender Characteristics			
Log of Total Assets	-0.069 (-1.58)	-0.103 (-1.47)	-0.176 (-3.57)***
Risk-based Capital Ratio	0.034 (0.51)	-0.637 (-5.49)***	-0.207 (-3.48)***
Growth Rate of Totals Assets	-0.103 (-0.92)	0.157 (1.60)	0.014 (0.14)
Return on Assets	64.87 (3.89)***	41.41 (1.74)*	61.17 (3.10)***
Risk-weighted Assets/Total Assets	-2.108 (-3.03)***	1.560 (1.52)	-2.970 (-3.46)***
1-4 Family Residential Mortgage Loans/Total Assets	6.658 (11.14)***	-1.059 (-1.18)	-5.171 (-7.26)***
Number of Observations	2,508	2,165	7,590
$\chi^2(25)$	426.35***	145.66***	215.25***
Pseudo R^2	0.1352	0.0646	0.0512
Log Likelihood	-1,364	-1,055	-1,993

Note: *** Significant at the 99% level; ** Significant at the 95% level
* Significant at the 90% level

minority borrowers, or applications to purchase properties in low-income and minority neighborhoods, are discouraged or pre-screened, discriminatory treatment against these classes of borrowers will go undetected by traditional accept/reject studies. To investigate this possibility, consider the case of two prospective home buyers with approved mortgage applications in hand. If interest rates decline before the mortgage is closed, the home buyer with greater access to capital markets may be more willing and able to pass up the current mortgage in hopes of obtaining alternative, and more favorable, financing.

Column 3 of Table 3-5 investigates this scenario by substituting a new dependent variable (equal to one if the application was approved by the lender but not accepted by the applicant, and zero if the application was approved and funded by the lender) into the previous model specification. Once again, little evidence is found supporting charges of vast disparities in credit market access. While high income applicants (low loan-to-income ratios) are slightly more likely to pass up approved mortgages than their low-income counterparts, the race and gender of the mortgage applicant exhibits no connection to the probability of passing up an approved loan. Interestingly, the only tract level coefficient which is even marginally significant (% of tract residents with a high school education or the equivalent) suggests educational attainment is inversely related to the probability an approved mortgage will be passed up by potential borrowers.[18] Results for the lender characteristics suggest prospective borrowers are also more likely to pass up financing offered by small, under-capitalized banks, which do relatively little mortgage lending. One potential explanation for this finding is that larger banks may have better access to capital markets, allowing them to borrow and lend at relatively attractive rates. Prospective borrowers who "shop" for the optimal financing arrangement may therefore be more likely to find such terms at larger, or more reputable institutions. Once again, the present investigation fails to uncover significant evidence of vast disparities in access to the credit system along borrower and neighborhood racial and income classifications.

---

[18] One potential explanation for the observed sign pattern hypothesizes applications falling into the approved but not accepted category are offered by the lender at above market rates or on other non-favorable terms (for example, with high down payment requirements). Ex-ante expectations would suggest such non-market terms would be offered most frequently to borrowers with few financing alternatives (i.e. where lenders hold the bargaining power). Given the well documented inability of mortgage lenders to rate sort prospective borrowers (due to regulatory and moral hazard

Summary and Conclusions

Previous studies of disparities in mortgage lending which fail to adequately control for the operating and financial position of the prospective lenders suffer from a potentially serious omitted variables bias. Using data from Pinellas county (St. Petersburg), Florida, over the period 1993-1995, the present study conclusively demonstrates bank-specific characteristics materially influence the underwriting processes of mortgage lenders. In addition to their individual significance, lender attributes significantly altered the relationship between acceptance rates and traditional model parameters of interest including race, gender, and information effects. Specifically, all evidence of "red-lining" or underserved market areas based upon the neighborhood's racial composition or applicant's gender was reduced to insignificant proportions via the inclusion of institutional characteristics. On the other hand, the magnitude and significance of

---

considerations), it is unlikely such market imperfections could persist.

information externalities was enhanced by expanding the information set of relevant variables. These findings, besides representing the first multi-period evidence of the existence of such externalities, suggest previous studies which have omitted the lender's identity have likely understated the true magnitude of information effects. Robustness checks on the sample data also yielded interesting results. While little evidence was found supporting allegations of banks window dressing acceptance rates or claims of unequal access to credit markets along racial and income classifications, the data indicate potential disparities in the coaching or guidance received by mortgage applicants may indeed vary along these same dimensions. Clearly, ample evidence exists to mandate the inclusion of lender characteristics in future models of the mortgage underwriting process.

CHAPTER 4
THE PROFITABILITY OF COMMUNITY REINVESTMENT ACT LENDING: EVIDENCE FROM RATING REVISIONS

Introduction

Is Community Reinvestment Act (CRA) lending profitable? This seemingly simple question has generated considerable debate, but few answers. For example, consider the following statements from two industry insiders on the frontline of low-income lending:

> "If you're out there trying to meet people's needs, and you back it up, word gets around...Word of mouth--that's your best advertising."
> Irving Loundy, executive, Devon Bank of Chicago

> It's a good business opportunity...It's an opportunity to do good at the same time as doing well."
> Emma C. Chappell, founder, United Bank of Philadelphia

Proponents of the legislation point toward anecdotal success stories, such as those at Devon Bank, United Bank, and the more widely publicized Delaware Valley Mortgage Plan, to argue Community Reinvestment Act regulations should enhance (or at least not diminish) the profitability of lending institutions.[1] They further suggest that reaching out to serve the special needs of the local community enhances bank profitability along two frontiers. First, previously underserved market niches should provide economic profits, in the short-run, to those banks who enter and exploit existing opportunities. Second, undertaking CRA related activities will enhance the reputation of the institution within the community, thus generating loyalty among current patrons, and facilitating the acquisition of additional customers in the future.

---

[1] See Melby (1997) for a further discussion of Devon Bank and United Bank. See Calem (1993) for an in depth analysis of the Delaware Valley Mortgage Plan.

Opponents of the regulation, on the other hand, rely on economic theory to justify their arguments. They suggest the mortgage market must be considered relatively efficient, given the numerous sources of financing available. In such an efficient market, discrimination and underserved market areas can not persist, as financial intermediaries will compete for the right to extend mortgage credit to qualified applicants. Therefore, they continue, lenders must already be taking advantage of any and all profitable lending opportunities which exist within the mortgage market, and any governmental mandates or interference, such as the Community Reinvestment Act, will serve only to erect artificial barriers in the credit allocation process. In conclusion, they suggest these barriers may significantly impair the profitability of financial institutions subjected to such regulations.

Unfortunately, little empirical evidence abounds to support either position. With this gap in mind, the purpose of this investigation is first, to determine what, if any, characteristics of a financial institution make it more (or less) likely to undertake actions which enhance (diminish) its consumer compliance activities, and second, to assess the effect of changing compliance paradigms on the profitability and loan loss experience of the institution. Specifically, I find large institutions which increase their lending activities (as a percentage of total business activities) are likely candidates for rating upgrades. In addition, the results of this analysis indicate CRA lending initiatives represent a relatively high cost activity for most banks, as a reduction in profitability and an increase in loan loss severity is documented surrounding compliance changes. Together, these findings suggest CRA lending is not as profitable as the traditional activities of most financial institutions.

The remainder of this paper is organized as follows. Section two provides a brief history of the Community Reinvestment Act and its affect on financial institutions. Section three motivates the empirical tests and outlines the data and methodology to be employed throughout the investigation. The empirical results are presented in section four, while section five summarizes the major findings and implications of this analysis and concludes the investigation.

The Community Reinvestment Act: A Brief History

The Community Reinvestment Act is widely regarded as one of the most controversial and influential pieces of consumer compliance regulation in history. Unlike typical regulatory mandates, which prohibit financial institutions from taking specified actions, the CRA places an affirmative obligation on lenders to seek out and meet the unique credit needs of their local customer base. This unique regulatory philosophy, combined with the intentionally vague nature of the regulation, requires a proactive approach on the part of banks to maintain compliant operations.

Compliance with the Community Reinvestment Act is evaluated periodically by the regulatory body charged with supervisory oversight for the institution.[2] From the inception of the Act, in the mid-1970's, through the end of the 1980's, numeric ratings based upon a five point scale (1=best) were given to each institution, with the results considered the proprietary information of the bank under review. This system was radically redesigned, via the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA), to include qualitative ratings based upon twelve (process based) performance factors[3] and to require public disclosure of CRA exam ratings. Today, examiners monitor institutional performance at approximately eighteen month intervals, and assign qualitative ratings of "Outstanding," "Satisfactory," "Needs To Improve," or "Substantial Non-Compliance" to each entity.[4] The present system, which employs Lending, Service, and Investment tests to evaluate the relative performance of a given bank within its designated market area, was adopted in April 1995, phased in over a two year period ending July 1, 1997, and retains the public disclosure mandates of FIRREA.[5]

---

[2] Specifically, the Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), and Federal Reserve (FED) all conduct compliance

Interestingly, the only tool available to regulators in enforcing CRA provisions is their ability to approve or deny applications for mergers, acquisitions, and expansions. While on the surface it may appear as if banks have little incentive to comply, in practice, the power of this regulatory hammer should not be underestimated. For example, Jehle

---

examinations of the institutions they regulate.

[3] See Harrison (1998)

[4] For a more complete description of each rating classification, see Harrison (1998).

[5] For a detailed history of the Community Reinvestment Act, see Garwood and Smith (1993), Spong (1994), Moore (1995) and Johnson and Myers (1996). The twelve CRA assessment categories and performance factors were replaced as of July 1, 1997.

(1986) notes the ability to approve or deny merger applications is one of the most important functions of bank regulators, particularly in the rapidly consolidating financial services industry of today. Furthermore, the potential impact of this regulatory enforcement mechanism has not gone unnoticed by market participants, as capital market rating agencies routinely include CRA ratings in their assessments of financial institutions.[6] While CRA regulations continue to evolve, their importance remains unquestioned.

Data, Motivation, and Methodology

While there is little dispute as to the regulatory significance of the Community Reinvestment Act, there is considerable debate as to the economic burden the provisions place on regulated institutions. Unfortunately, very little consistent or direct empirical evidence exists in addressing this question. For example, Canner and Passmore (1996a, 1996b, and 1997) find financial institutions which specialize in lending to lower-income borrowers or in lower-income neighborhoods are as profitable as their peer institutions. However, Meeker and Myers (1996) report low-income loans have higher paperwork and monitoring costs, and exhibit higher delinquency rates (though similar revenues and default rates) than conventional loans. Furthermore, they find that while the vast majority (98%) of institutions report profitable CRA loan activities, over three-fourths (76%) of these programs are less profitable than the traditional lending activities of the institution. Clearly, a better methodology is needed to ascertain the true economic impact of enhancing an institution's consumer compliance activities.

---

[6] See Schill and Wachter (1994)

To assess the economic importance of Community Reinvestment Act lending, a data set containing all FDIC regulated financial institutions[7] which underwent CRA rating revisions between July 1, 1990 and April 15, 1995 was assembled. Rating revisions should be particularly informative, as they represent regulatory acknowledgment of a change in consumer compliance practices, policies, and performance. This sample of 1,467 institutions was also specifically designed to mitigate the potential problem of inconsistent ratings across regulatory agencies pointed out by Burwell and McCarthy (1995) and Moore (1995), as all compliance evaluations were conducted by the FDIC.[8] In addition, the time frame was selected to include all revisions occurring under a single regulatory regime. Exam ratings first became publicly available on July 1, 1990, while the most recent major overall of CRA guidelines was completed (though not fully implemented) in April of 1995.

Significant evidence exists to believe a bank's performance under CRA guidelines varies systematically with its unique operating characteristics. For example, Miller (1994) and Johnson and Sarkar (1996) argue small banks, due to economies of scale in data collection, processing, and documentation, are at a competitive disadvantage when it comes to CRA compliance. In addition, Black, Collins, and Cyree (1997) argue the financial strength and capitalization of an institution influences the underwriting standards they select, while Calomiris, Kahn, and Longhofer (1994) suggest financial constraints explain the notoriously poor CRA compliance performance of minority owned banks. Finally, Harrison (1997) contends regulatory effects, specialization, and financial considerations combine to push lenders with divergent characteristics toward differential compliance policies. To assess and control for the importance of these systematic inter-lender differences on compliance activities, operating characteristics and performance data for each institution were collected from the Federal Financial Institutions Examination Council's (FFIEC) reports of condition and income (call reports) and merged with the rating revisions.

---

[7] The Federal Deposit Insurance Corporation (FDIC) maintains supervisory authority over state banks which choose not to become members of the Federal Reserve system.

[8] Differential enforcement practices across individual examiners within the FDIC remains as a potential source of bias. However, standardized training practices should also mitigate this problem.

Performance data, encompassing multiple dimensions of an institution's operating performance, was then collected. First, given the traditional focus of CRA initiatives within the lending function of most institutions, information on the total loans and leases, net of unearned income, as a percentage of the firm's total assets was obtained. Next, information on the total assets (logged to control for potential non-linearities) and total equity capital (as a percentage of total assets) held by the institution were procured to address the concerns raised above. Finally, given this investigation's focus on the profitability and loan loss experience of CRA lending, data on each institution's return on assets, as well as their net interest income, allowance for loan and lease losses, provisions for loan and lease losses, recoveries on allowance for loan and lease losses, and charge-offs on allowance for loan and lease losses (all scaled by the total lending volume of the institution) were gathered and included in the data set. These characteristics were collected and measured at two points in time: December 31 of the year preceding the initial compliance exam and December 31 of the year in which the rating revision occurred. This time frame ensures the estimation interval encompasses the change in compliance paradigms, as each attribute is effectively measured before and after the regime change. Descriptive statistics regarding the magnitude of each variable before the revisions occurred are presented in Table 4-1. Table 4-2 presents the same information, measured following the compliance revisions. Finally, Table 4-3 presents descriptive statistics regarding the percentage change in each institutional attribute surrounding the compliance change.

An analysis of the data presented in Tables 4-1 through 4-3 suggests banks experiencing upgrades hold more loans, both before and after the rating revisions, than their counterparts experiencing downgrades. Similarly, the percentage change in lending volume is higher at upgraded institutions. Interestingly, institutions on the way up appear less profitable than their counterparts when measured before the compliance change, but more profitable afterwards. These findings are consistent with the hypothesis that CRA lending is beneficial to an institution's bottom line. It is important to note, however, that this same profitability pattern is not statistically significant in Table 4-3, which measures profitability in terms of the percentage change from before, until after, the rating revision.

Non-parametric tests of loan loss experience also suggest CRA lending makes good business sense. For example, provisions for loan and lease losses, as a percentage of total loans, are higher at upgraded institutions before, but not after, a firm enhances its compliance activities. Similarly, the percentage change in allowances for loan and lease losses per dollar of lending volume is lower at upgraded institutions than at those

Table 4-1

Descriptive statistics for FDIC regulated institutions experiencing Community Reinvestment Act rating revisions, 7/1/90 - 4/15/95. Lender characteristics measured as of December 31, of the year preceding the original compliance examination.

	All Ratings		Rating Upgrades		Rating Downgrades		t-test of difference
Lender Characteristics	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Log of Total Assets (,000 of $)	10.95	1.16	10.96	1.16	10.94	1.18	0.25
Total Equity Capital/Total Assets (%)	9.16	4.01	9.19	4.31	9.08	3.06	0.44
Total Loans & Leases, Net of Unearned Income/Total Assets (%)	52.73	16.77	53.35	16.84	51.07	16.50	2.23**
Allowance for Loan & Lease Losses/Total Loans (%)	1.85	1.22	1.88	1.26	1.77	1.10	1.37
Provision for Loan and Lease Losses/Total Loans (%)	0.84	1.33	0.89	1.43	0.70	1.04	2.38**
Charge-offs on Allowance for Loan & Lease Losses/Total Loans (%)	0.95	1.40	0.98	1.47	0.87	1.19	1.31
Recoveries on Allowance for Loan & Lease Losses/Total Loans (%)	0.24	0.41	0.24	0.44	0.23	0.32	0.41
Net Income/Total Assets (%)	0.79	0.99	0.75	1.06	0.89	0.76	-2.33**
Net Interest Income/Total Loans (%)	8.73	5.78	8.55	5.74	9.23	5.87	-1.93*

Note: *** Significant at the 99% level; ** Significant at the 95% level; * Significant at the 90% level

Table 4-2

Descriptive statistics for FDIC regulated institutions experiencing Community Reinvestment Act rating revisions, 7/1/90 - 4/15/95. Characteristics measured as of December 31, of the year encompassing the rating revision

	All Ratings		**Rating Upgrades**		**Rating Downgrades**		**t-test of difference**
Lender Characteristics	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Log of Total Assets (,000 of $)	11.10	1.17	11.11	1.17	11.07	1.17	0.52
Total Equity Capital/Total Assets (%)	9.63	3.47	9.64	3.57	9.61	3.20	0.15
Total Loans & Leases, Net of Unearned Income/Total Assets (%)	53.84	16.58	54.79	16.43	51.27	16.74	3.48***
Allowance for Loan & Lease Losses/Total Loans (%)	1.97	1.50	1.94	1.51	2.04	1.48	-1.10
Provision for Loan and Lease Losses/Total Loans (%)	-0.90	50.61	-1.40	59.29	0.44	1.35	-0.59
Charge-offs on Allowance for Loan & Lease Losses/Total Loans (%)	1.74	40.27	2.15	47.18	0.66	1.03	0.60
Recoveries on Allowance for Loan & Lease Losses/Total Loans (%)	0.55	11.76	0.66	13.78	0.27	0.63	0.55
Net Income/Total Assets (%)	1.05	0.99	1.08	0.98	0.96	1.00	2.05**
Net Interest Income/Total Loans (%)	9.51	20.81	9.48	24.14	9.58	5.62	-0.08

Note: *** Significant at the 99% level; ** Significant at the 95% level; * Significant at the 90% level

Table 4-3

Descriptive statistics for FDIC regulated institutions experiencing Community Reinvestment Act rating revisions, 7/1/90 - 4/15/95. Changes in lender characteristics are measured between December 31, of the year preceding the original compliance examination and December 31, of the revision year.

	All Ratings		Rating Upgrades		Rating Downgrades		t-test of difference
Change in Lender Characteristics	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Log of Total Assets (,000 of $)	0.47	0.90	0.50	0.93	0.40	0.82	1.76*
Total Equity Capital/Total Assets (%)	6.43	51.17	5.61	58.45	8.62	21.83	-0.95
Total Loans & Leases, Net of Unearned Income/Total Assets (%)	5.14	26.17	5.93	26.84	3.02	24.18	1.81*
Allowance for Loan & Lease Losses/ Total Loans (%)	19.69	76.91	17.49	77.54	25.60	74.96	-1.72*
Provision for Loan and Lease Losses/Total Loans (%)	-40.70	2087.72	-53.18	2441.45	-7.04	202.62	-0.34
Charge-offs on Allowance for Loan & Lease Losses/Total Loans (%)	179.63	2526.00	215.76	2949.45	84.83	541.67	0.83
Recoveries on Allowance for Loan & Lease Losses/Total Loans (%)	187.52	1140.23	193.64	1248.42	171.67	795.57	0.30
Net Income/Total Assets (%)	-8.99	1080.94	19.26	663.20	-84.63	1765.98	1.57
Net Interest Income/Total Loans (%)	16.06	322.68	19.22	377.59	7.59	33.77	0.59

Note: *** Significant at the 99% level; ** Significant at the 95% level; * Significant at the 90% level

experiencing downgrades. Finally, rapidly growing firms are more likely to receive upgrades. This result is not surprising given the targeted regulatory enforcement mechanism described above.

While the descriptive statistics presented above provide unique insight into CRA lending activities, they are limited because they only address the importance of each lender characteristic in isolation. A more interesting question asks which of these institutional attributes, when taken together, influence a bank's decision to enhance (reduce) its community reinvestment initiatives. By imposing structure on this relationship, we can evaluate the joint significance of each lender characteristic with regard to compliance performance, profitability, and loan loss experience. Specifically, the analysis proceeds in two stages. First, to evaluate the relative importance of each factor in predicting compliance changes, a binary logit model of the following general form is employed:

$$\textbf{REVISION} = f\,(\textbf{Size, Capitalization, Lending Volume, Loan Loss Severity, Profitability}, \epsilon)$$

where REVISION is equal to 1 if the institution experienced a rating upgrade, and 0 if the institution experienced a rating downgrade. Size, capitalization, lending volume, loan loss severity, and profitability all represent the changes in each attribute from December 31 of the year before the initial rating was assigned to December 31 of the year in which the rating revision occurred.[9]

---

[9] The percentage change in firm size is annualized to account for the variable length of time between initial and revised ratings across institutions.

Stage two of the analysis reverses the question, and asks the even more important question of what impact does enhancing (diminishing) an institution's consumer compliance activities have on the future profitability and loan loss experience of the firm. To address this second question, a series of standard OLS models, each using the following general form, are employed:

$$\textbf{CHANGE} = f\,(\textbf{Size, Capitalization, Lending Volume, Loan Loss Severity, Profitability, Rating Revision}, \epsilon)$$

where CHANGE is first measured as the level of each attribute on December 31 of the revision year, and secondly, as the percentage change in the level of each characteristic from December 31 of the year preceding the initial rating to December 31 of the revision year. Institution size, profitability, lending volume, loan loss severity, and profitability are once again measured in percentage change terms, as in stage one of the analysis. Rating Revision is equal to one if the institution experienced an upgrade and zero if the bank's compliance activities were downgraded. This model is designed to focus on the profitability impact of compliance changes, and thus, is estimated for changes in the firm's return on assets, net interest margin, and provisions per dollar of lending volume.[10]

Empirical Results

Rating Revisions

Table 4-4 presents results from the logit model regressing REVISIONS against changes in institutional attributes, and simulations to estimate the economic significance of

---

[10] For the purposes of this paper, net interest margin refers to the ratio of net interest income to total loans and leases, net of unearned income.

Table 4-4
Logit Regressions Explaining Revisions to Community Reinvestment Act Ratings at FDIC Regulated Financial Institutions, 7/1/90 - 4/15/95
Model #1: 0=Downgrade and 1=Upgrade
Model #2: 0=Downgraded to Non-compliant and 1=Upgraded to Compliant

VARIABLE	Model 1	Simulation	Model 2	Simulation
Constant	0.842 (8.90)***	-----	0.874 (6.49)***	-----
Change in Lender Characteristics				
Log of Total Assets (Annualized)	21.29 (2.26)**	3.59%	15.02 (1.32)	2.73%
Total Equity Capital/Total Assets	-0.072 (-0.74)	-0.73%	-0.128 (-0.93)	-1.38%
Total Loans & Leases, Net of Unearned Income/Total Assets	0.822 (2.33)**	4.01%	0.896 (1.81)*	4.62%
Allowance for Loan & Lease Losses/Total Loans	-0.299 (-2.49)**	-4.74%	-0.369 (-2.34)**	-6.20%
Provision for Loan and Lease Losses/Total Loans	0.056 (1.88)*	16.69%	0.093 (1.85)*	23.73%
Charge-offs on Allowance for Loan & Lease Losses/Total Loans	0.008 (0.63)	3.99%	0.017 (0.91)	7.99%
Recoveries on Allowance for Loan & Lease Losses/Total Loans	0.006 (0.92)	1.39%	0.001 (0.13)	0.18%
Net Income/Total Assets	0.007 (1.74)*	1.55%	-0.006 (-0.39)	-1.26%
Net Interest Income/Total Loans	0.490 (1.49)	19.81%	-0.178 (-0.49)	-13.09%
Number of Observations	1,063	1,063	446	446
$\chi^2(9)$	28.92***	-----	23.18***	-----
Pseudo R^2	0.0197	-----	0.0441	-----
Log Likelihood	-616.39	-----	-263.74	-----

Note: *** Significant at the 99% level
** Significant at the 95% level
* Significant at the 90% level

each characteristics. Model 1 uses the entire sample of banks experiencing rating revisions and finds rapidly growing and increasingly profitable institutions, which are expanding their portfolios of loans and leases, are likely candidates for rating upgrades. One potential explanation for these findings is that institutions choosing to specialize in lending, develop unique knowledge, skills, and abilities which allow them to more profitably enter, or expand lending programs within, CRA targeted markets. Allowances and provisions for loan and lease losses both also appear statistically significant in model 1, but with opposite signs. Given the inter-related nature of these variables, a more detailed simulation analysis is required to assess and explain these seemingly conflicting results.

To gain a complete understanding of the economic significance of each of these lender characteristics on compliance decisions, logistic simulations were performed with the results presented in column two. The simulations were conducted by first setting the value of each lender characteristic at its mean and then estimating the probability of receiving an upgrade. Next, each variable was independently shocked (increased) by ten percent of its magnitude, and the resulting probability of receiving an upgrade was recalculated with the remaining variables held constant at their respective means. The values presented in column two represent the difference in the probability of receiving an upgrade with each variable independently set at its simulated value. This analysis provides an indication of the economic determinants of changing compliance practices, and clearly suggests compliance changes are most sensitive to shifts in the profitability of the institution. In addition, it is readily observable that the magnitude of the relationship between loan loss provisions and rating revisions far exceeds that exhibited between loan loss allowances and rating revisions. Thus, rating upgrades are characterized by both increasing profitability and loan loss severity.

Changing Compliance

Column 3 of Table 4-4 replicates the previous analysis over a more conservatively defined dependent variable. Many sample institutions exhibiting positive rating revisions moved from "Satisfactory" to "Outstanding" performance, and thus, from a regulatory perspective did not exhibit a change in compliant behavior. By redefining the dependent variable to classify only those firms moving from "Substantial Non-Compliance" or "Needs To Improve" to "Satisfactory" or "Outstanding" as upgrades, and similarly classifying only those firms moving from "Outstanding" or "Satisfactory" to "Needs To Improve" or "Substantial Non-Compliance" as downgrades, we may gain a better understanding of which institutional characteristics facilitate or undermine compliant behavior.

The results from this subsample are generally consistent with those reported for the more broadly defined upgrades. In model two, the percentage change in lending volume continues to be positively related to the probability of receiving an upgrade, while the conflicting sign pattern between loan loss allowances and loan loss provisions is once again observed. Interestingly, the most important determinant of upgrades as a whole, net interest income per dollar of lending volume, exhibits no explanatory power over the subset of compliance changes. This finding is consistent with the belief that satisfactory compliance with CRA provisions is a regulatory necessity, but outstanding performance is an operating luxury. Turning to simulations for evidence of the magnitude of these relationships, it is noted that compliance changes now appear to be most sensitive to changes in loan loss severity. In general, the fundamental determinants of rating revisions are consistent across both the full sample of rating revisions and the subsample of compliance changes.

Profitability

Is CRA lending profitable? Table 4-5 addresses this question by regressing each institution's return on assets, net interest margin, and provisions per dollar of lending volume as measured on December 31 of the revision year against a dichotomous variable equal to one if the rating represented improved compliance performance, and zero if the institution was downgraded.[11] Once again, our continuing set of percentage changes in lender characteristics, measured from December 31 of the year preceding the initial rating to December 31 of the revision year, are included in all model specifications as control variables. Examining column one we find no evidence of a relationship between changing compliance paradigms and firm wide profitability, as the coefficient on the discrete choice CRA Rating Upgrade variable is both statistically and economically insignificant. Additional evidence form column one suggests rapidly growing, well capitalized

---

[11] Return on assets and net interest margin are widely regarded as two of the most important measures of banking efficiency and profitability, while provisions for loan losses represent an institution's assessment of changes in the credit quality of their loan portfolio. See, for example, Mishkin and Eakins (1998) for an extended treatment of profitability and loss measures in the banking industry.

Table 4-5

OLS regressions explaining profitability of FDIC regulated institutions following CRA rating revisions, 7/1/90 - 4/15/95. Profitability measured as of December 31, of the revision year.

VARIABLE	Net Income / Total Assets	Net Interest Income / Total Loans	Provisions / Total Loans
Constant	0.009 (12.92)***	0.089 (39.43)***	0.004 (5.59)***
Change in Lender Characteristics			
Log of Total Assets (Annualized)	0.256 (3.67)***	-0.159 (-1.41)	0.001 (0.02)
Total Equity Capital/Total Assets	0.001 (1.70)*	0.002 (2.30)**	0.001 (0.44)
Total Loans & Leases, Net of Unearned Income/Total Assets	0.008 (3.22)***	-0.001 (-0.16)	-0.003 (-1.01)
Allowance for Loan & Lease Losses/Total Loans	-0.002 (-2.62)***	-0.004 (-2.26)**	0.005 (2.82)***
Provision for Loan and Lease Losses/Total Loans	-0.000 (-0.99)	-0.001 (-2.56)**	0.001 (2.39)**
Charge-offs on Allowance for Loan & Lease Losses/Total Loans	-0.000 (-1.21)	-0.000 (-0.41)	0.000 (0.10)
Recoveries on Allowance for Loan & Lease Losses/Total Loans	-0.000 (-0.22)	-0.000 (-0.69)	-0.000 (-0.97)
Net Income/Total Assets	0.000 (0.79)	0.000 (0.96)	-0.000 (-0.77)
Net Interest Income/Total Loans	0.006 (1.67)*	0.047 (6.90)***	-0.010 (-1.37)
CRA Rating Upgrade	0.001 (0.85)	-0.007 (-3.26)***	0.001 (1.34)
Number of Observations	1,063	1,063	1,063
F(10, 1052)	4.91***	9.20***	2.04**
Adjusted-R^2	0.1481	0.1715	0.1738

Note: *** Significant at the 99% level
** Significant at the 95% level
* Significant at the 90% level

institutions with relatively profitable and expanding loan programs are generally more efficient than their counterparts.

Column two focuses the spotlight of the investigation more squarely on the lending activities of sample institutions, the arena most frequently associated with CRA initiatives. The results, which are strikingly different from those reported in column one, indicate net interest income per dollar of lending volume is significantly lower at firms experiencing upgrades than at those experiencing downgrades. Once again, well capitalized institutions with strong lending departments appear more profitable, but the overriding conclusion from column two is enhancing an institution's CRA related activities significantly lowers the profitability of the firm's lending operations.

Any true examination of firm profits would be incomplete without a concurrent analysis of firm risk. If loan loss severity is directly related to enhanced community reinvestment initiatives, the negative effect on long-run firm profitability may compound the observed decrease in net interest income documented above. The final column of Table 4-5 investigates this possibility and finds no evidence of such a relationship. Specifically, column three regresses the level of provisions for loan and lease losses, as measured on December 31 of the revision year, against our common set of control variables and the rating revision dummy. No significant relationship between provisions and rating revisions can be documented, as once again the coefficient on the CRA Rating Upgrade variable is both statistically and economically insignificant. In fact, provisions appear unrelated to changes in all institutional attributes except other measures of loan loss severity. An analysis of provisions for loan and lease losses fails to document any significant increase in the severity of institutional exposure following improvements in bank compliance practices. Together, the three columns of Table 4-5 suggest profitability effects of changing compliance paradigms are manifested in the form of lower profitability within the lending segment of the firm's operations.

As in the previous analysis, Table 4-6 employs return on assets, net interest margin, and provisions for loan and lease losses per dollar of lending volume to evaluate the impact of changing compliance practices on institutional profitability. This time, however, the dependent variables are also measured as the percentage change in each institutional attribute, from December 31 of the year preceding the initial exam to December 31 of the revision year, and regressed against the CRA Rating Upgrade indicator and operating performance control variables. Interestingly, the results in Table 6 diverge in form, but not in spirit, from those reported in the previous table. Specifically, columns one and two fail to document any relationship between either firm-wide or lending division profitability and compliance performance, while column three indicates provisions for loan and lease losses rise following stepped up CRA activities. These results suggest the profitability impact of enhanced CRA lending programs is manifested in the form of higher risk within the institution's lending portfolio, rather than in the form of reduced profitability. Regardless of which methodology is employed, the basic conclusion of the analysis remains unchanged. CRA lending programs do not appear to be as attractive (profitable) as the traditional activities of most lending institutions.

Table 4-6

OLS regressions explaining changes in profitability for FDIC regulated institutions surrounding CRA rating revisions, 7/1/90 - 4/15/95. Changes in lender characteristics are measured between December 31, of the year preceding the original compliance examination and December 31, of the revision year.

VARIABLE	Net Income Total Assets	Net Interest Income Total Loans	Provisions Total Loans
Constant	-1.160 (-1.07)	0.107 (4.40)***	-0.445 (-4.03)***
Change in Lender Characteristics			
Log of Total Assets (Annualized)	8.615 (0.30)	-4.946 (-2.44)**	20.56 (2.15)**
Total Equity Capital/Total Assets	-0.257 (-0.80)	0.016 (0.57)	-0.224 (-1.47)
Total Loans & Leases, Net of Unearned Income/Total Assets	1.411 (1.21)	-0.623 (-8.58)***	1.121 (1.99)**
Allowance for Loan & Lease Losses/Total Loans	-0.080 (-0.13)	0.017 (1.00)	0.727 (3.38)***
Provision for Loan and Lease Losses/Total Loans	0.004 (0.11)	-0.001 (-0.18)	-----
Charge-offs on Allowance for Loan & Lease Losses/Total Loans	-0.022 (-1.27)	0.001 (0.58)	0.234 (4.20)***
Recoveries on Allowance for Loan & Lease Losses/Total Loans	0.003 (0.18)	0.001 (1.46)	-0.014 (-2.26)**
Net Income/Total Assets	-----	0.001 (1.27)	0.000 (0.11)
Net Interest Income/Total Loans	1.672 (2.03)**	-----	-0.157 (-0.19)
CRA Rating Upgrade	1.132 (1.01)	0.022 (1.56)	0.293 (2.00)**
Number of Observations	1,063	1,063	1,063
F(9, 1053)	1.17	22.79***	5.21***
Adjusted-R^2	0.0034	0.3176	0.3562

Note: *** Significant at the 99% level
** Significant at the 95% level
* Significant at the 90% level

Summary and Conclusions

Is Community Reinvestment Act lending profitable? To date, very little empirical evidence has been available to help answer this question. The current investigation attempts to fill this gap in the current literature, by first asking what institutional attributes influence a banking firm's decision to enhance, rather than diminish, its community reinvestment initiatives. The results indicate rapidly growing institutions with an increased emphasis on lending operations are likely candidates for upgrades. Similarly, institutions characterized by increasing levels of loan loss provisions, an indicator the firm is reaching more deeply into the applicant pool to satisfy unique credit needs, are also likely to see their compliance ratings improve. Finally, evidence was presented suggesting increasingly profitable institutions are also more likely to experience CRA rating upgrades than their less profitable counterparts.

After documenting the factors which precipitate rating revisions, the after-market effects of the compliance change on both institutional profitability and loan loss severity were examined. Specifically, the evidence presented in this paper suggests enhancing CRA lending activities leads to either a decrease in the profitability of the firm's lending operations or, alternatively, an increase in the loan loss severity suffered by sample institutions. Is CRA lending as profitable as the traditional lending activities of financial institutions? The results of this investigation suggest the answer is no. While such initiatives may open up new markets and facilitate the development of specialized knowledge, skills, and abilities which provide the bank with a competitive advantage in the future, evidence from CRA rating revisions suggests the costs of such activities outweigh the benefits of improved compliance performance for a majority of financial institutions.

CHAPTER 5
CONCLUSION
THE FUTURE OF LOW-INCOME LENDING: WHAT WE KNOW AND WHAT WE NEED TO KNOW

The vast majority of residential mortgage market transactions within this country involve the use of borrowed money. While numerous studies have gone to great lengths examining which borrower characteristics influence the functioning and operation of this market, very little attention has been given to the divergent roles played by financial institutions with differing operating characteristics. Is lender identity important in analyses of the mortgage market? The current analysis investigated the severity of this omitted variables problem by examining the importance of inter-lender differences such as size, capitalization, lending volume, profitability, and loan loss experience from regulatory, borrower, and managerial perspectives and concludes lender identity is an extremely valuable indicator of mortgage market outcomes.

From a regulatory perspective, the fundamental question is what, if any, institutional characteristics systematically influence the consumer compliance policies of regulated lenders. To address this question, an ordered probit model regressing a firm's observed CRA rating against measures of the financial position, organization structure, and local community demographics was employed. The model used a sample of 1,188 financial institutions evaluated for Community Reinvestment Act (CRA) compliance. All institutions were examined by the Federal Deposit Insurance Corporation during the second half of 1990, and the results indicate large and profitable banks receive better compliance evaluations than their counterparts. In addition, holding company banks were also shown to receive higher grades, primarily due to the targeted regulatory enforcement mechanism of approval authority on merger, acquisition, and expansion activities. This enforcement mechanism focuses on holding companies for two reasons. First, holding companies tend to be more growth oriented than unaffiliated institutions, and second, a poor CRA rating at even a small subsidiary can delay, if not derail, the merger, acquisition, or expansion plans of the entire conglomerate. What do we know? CRA ratings are systematically related to institutional characteristics.

What do we need to know? First, what explains the race-income paradox highlighted throughout chapter two? At this juncture, no satisfactory explanation has been provided for this phenomenon. Second, do these results generalized to a longer time period and alternative regulatory regimes? Due to data collection constraints, the results were derived using a relatively short time frame of six months. Given the ever increasing availability of government data, an extension of this study should be feasible within the very near future. It would be extremely interesting to learn whether the institutional attributes which were shown to be fundamental determinants of CRA ratings under the old regime remain important under the revised lending, service, and investment tests. Finally, given the previous evidence of differential rating policies across alternative regulatory agencies, do these same relationship hold for state-member banks and national banks? Once again, with the rapidly increasing availability of data on the U.S. financial system, answers to these question should be forthcoming within the next few years.

From a borrower perspective, the choice of potential lender was shown to significantly influence the probability of approval on applications for home purchase mortgage applications. Specifically, using a sample of Home Mortgage Disclosure Act (HMDA) records from Pinellas county (St. Petersburg) Florida, from 1993 to 1995, it was shown that the inclusion of lender identity significantly increased the explanatory power of traditional accept/reject decision models on home purchase mortgage applications. In addition, the inclusion of lender characteristics eliminated all evidence of red-lining (underserved market areas based upon the demographic characteristics of residents who live there, most notably the racial composition) effects documented in previous studies. Finally, the results of chapter three provide the first multi-period evidence of information externalities in home mortgage lending. The inclusion of lender characteristics was shown to dramatically increase the influence of the information externalities. What do we know? Lender characteristics systematically influence the underwriting processes of regulated lenders.

What do we need to know? First, are these results applicable to the entire nation, or are they simply a fiction or characteristic of the St. Petersburg (or general Florida) mortgage market? Clearly, these same lender characteristics should be applied to additional datasets from a nationwide sample of lenders. Second, why do information externalities exert such a strong influence over underwriting decisions? Most mortgages with loan-to-value ratios in excess of eighty percent are covered by mortgage insurance. If mortgage insurers stand in a first loss position, the effect of information externalities should be most pronounced in applications for private mortgage insurance. This is clearly an area worthy of future research.

Finally, from a managerial perspective, the key question becomes is low-income lending profitable? Using a sample of 1,467 CRA rating revisions of FDIC regulated banks between July 1, 1990 and April 15, 1995, I found institutions receiving upgrades were characterized by either lower profitability within their lending activities or increased riskiness within their loan portfolios. These results suggest CRA lending is not as profitable as the traditional activities of most banks. What do we know? Governmental mandates are costly to regulated firms.

What do we need to know? Many people agree there is a need for reinvestment within our nation's communities. The real question is what is the most efficient way to achieve this outcome? While many government programs are "carrot" or incentive based, community reinvestment act regulations have traditionally been viewed as "stick" or punishment based. Given the proper incentive system, would firms develop (or exercise) their social conscious? Would an incentive system reduce the antagonistic relationship which has developed between many banks and compliance regulators? In a capitalistic society should the government play any role in ensuring an equitable distribution of capital?

While the results of this investigation provided a new perspective and unique insight into the functioning of the low-income mortgage market, it also, in several dimensions, has raised as many new questions as it has answered.

BIBLIOGRAPHY

Becker, Gary, *The Economics of Discrimination*, University of Chicago Press: Chicago, Illinois, 1957.

Becker, Gary, *The Economics of Discrimination*, 2nd edition, University of Chicago Press: Chicago, Illinois, 1971.

Bell, Frederick W., and Neil B. Murphy, "Impact of Market Structure on the Price of a Commercial Banking Service," *The Review of Economics and Statistics*, v. 51, pp. 210-213, 1969.

Benston, George J., "Mortgage Redlining Research: A Review and Critical Analysis," *Journal of Bank Research*, v. 12, no. 1, pp. 8-23, Spring 1981.

Berkovec, James, Glenn Canner, Stuart Gabriel, and Timothy Hannon, "Race, Redlining, and Residential Mortgage Loan Performance," presented at the American Real Estate and Urban Economics Association conference in Washington, D.C., May 31, 1994.

Billett, Matthew T., Mark J. Flannery, and Jon A. Garfinkel, "The effect of Lender Identity on a Borrowing Firm's Equity Return," *The Journal of Finance*, v. 50, pp. 699-718, 1995.

Black, Fischer, "Bank Funds Management in an Efficient Market," *Journal of Financial Economics*, v. 2, pp. 323-339, 1975.

Black, Harold A., M. Cary Collins, and Ken B. Cyree, "Do Black-Owned Banks Discriminate against Black Borrowers?" *Journal of Financial Services Research*, v. 11, no. 1 & 2, pp. 189-204, 1997.

Boot, Arnoud W.A., Stuart I. Greenbaum, and Anjan V. Thakor, "Reputation and Discretion in Financial Contracting," *The American Economic Review*, v. 83, pp. 1165-1183, December 1993.

Bradbury, Katharine L., Karl E. Case, and Constance R. Dunham, "Geographic Patterns of Mortgage Lending in Boston, 1982-1987," *New England Economic Review*, 3-30, September/October 1989.

Buist, Henry, Isaac F. Megbolugbe, and Tina R. Trent, "Racial Homeownership Patterns, the Mortgage Market, and Public Policy," *Journal of Housing Research*, v. 5, no. 1, pp. 1-27, 1994.

Burwell, Stephen D. and Christine A. McCarthy, "Developments in Banking Law: 1994, Section X: Community Banking," *Annual Review of Banking Law*, v. 14, pp. 116-136, 1995.

Calem, Paul S., "Mortgage Credit Availability in Low- and Moderate-Income Minority Neighborhoods: Are Information Externalities Critical?" *Journal of Real Estate Finance and Economics*, v. 13, no. 1, pp. 71-89, 1996.

Calem, Paul S., "The Deleware Valley Mortgage Plan: Extending the Reach of Mortgage Lenders," *Journal of Housing Research*, v. 4, no. 2, pp. 337-358, 1993.

Calem, Paul S. and Susan M. Wachter, "Performance of Mortgages in a Community Reinvestment Portfolio: Implications for Flexible Lending Initiatives," working paper, August 1996.

Calomiris, Charles W., Charles M. Kahn, and Stanley D. Longhofer, "Housing-Finance Intervention and Private Incentives: Helping Minorities and the Poor," *Journal of Money, Credit, and Banking*, v. 26, no. 3, pp. 634-674, 1994.

Canner, Glenn B. and Wayne Passmore, "The Push of the Community Reinvestment Act: Is the Banking System Headed Over A Cliff?" working paper, Federal Reserve Board of Governors, December 19, 1996.

Canner, Glenn B. and Wayne Passmore, "The Relative Profitability of Commercial Banks Active in Lending in Lower-Income Neighborhoods and to Lower-Income Borrowers," *Proceedings of the Thirty-Second Annual Conference on Bank Structure and Competition*, Federal Reserve Bank of Chicago, May 1996.

Canner, Glenn B. and Wayne Passmore, "The Community Reinvestment Act and the Profitability of Mortgage-Oriented Banks," working paper 1997-7, Federal Reserve Board of Governors - Finance and Economics Discussion Series, February 4, 1997.

Canner, Glenn B., Wayne Passmore, and Dolores S. Smith, "Residential Lending to Low-Income and Minority Families: Evidence from the 1992 HMDA Data," *Federal Reserve Bulletin*, 79-108, February 1994.

Canner, Glenn B. and Dolores S. Smith, "Home Mortgage Disclosure Act: Expanded Data on Residential Lending," *Federal Reserve Bulletin*, pp. 859-881, November 1991.

Canner, Glenn B. and Dolores S. Smith, "Expanded HMDA Data on Residential Lending: One Year Later," *Federal Reserve Bulletin*, pp. 801-824, November 1992.

Diamond, Douglas W., "Reputation Acquisition in Debt Markets," *Journal of Political Economy*, v. 97, n. 4, 1989.

Duca, John, "Comments on 'Performance of Residential Mortgages in Low- and Moderate-Income Neighborhoods'," *Journal of Real Estate Finance and Economics*, v. 9, pp. 261-262, 1994.

Duca, John and Stuart S. Rosenthal, "Do Mortgage Rates Vary Based on Household Default Characteristics? Evidence on Rate Sorting and Credit Rationing," *Journal of Real Estate Finance and Economics*, v. 8, pp. 99-113, 1994.

Evanoff, Douglas D. and Lewis M. Segal, "Strategic Responses to Bank Regulation: Evidence From HMDA Data," *Journal of Financial Services Research*, v. 11, no. 1 & 2, pp. 69-93, 1997.

Flannery, Mark and Joel Houston, "Market Responses to Federal Examinations of Commercial Banking Firms," University of Florida Working Paper 96-9, 1996.

Gabriel, Stuart A. and Stuart S. Rosenthal, "Credit Rationing, Race, and the Mortgage Market," *Journal of Urban Economics*, 29, pp. 371-379, 1991.

Galster, George C., "Research on Discrimination in Housing and Mortgage Markets: Assessment and Future Directions," Fannie Mae, *Housing Policy Debate*, v.3, n.2, pp. 639-683, 1992.

Garwood, Griffith L. and Dolores S. Smith, "The Community Reinvestment Act: Evolution and Current Issues," *Federal Reserve Bulletin*, pp. 251-267, April 1993.

Gatzlaff, Dean H. and David C. Ling, "Measuring Changes in Local House Prices: An Empirical Investigation of Alternative Methodologies," *Journal of Urban Economics*, v. 35, pp. 221-244, 1994.

Greenbaum, Stuart, "Twenty-Five Years of Banking Research," *Financial Management*, v. 25, pp. 86-92, Summer 1996.

Guttentag, Jack M., and Susan M. Wachter, "Redlining and Public Policy," *The Monograph Series in Finance and Economics*, Edwin J. Elton and Martin J. Gruber (eds). Monograph, 1980.

Harrison, David M., "Bank-Specific Determinants of Community Reinvestment Act (CRA) Performance," working paper, University of Florida, 1997.

Harrison, David M., "The Community Reinvestment Act: When, Where, and Why It Works," working paper, University of Florida, 1998.

Houston, Joel, Christopher James, and David Marcus, "Capital Market Frictions and the Role of Internal Capital Markets in Banking," working paper, 1996.

Hula, Richard C., "Neighborhood Development and Local Credit Markets," *Urban Affairs Quarterly*, v. 27, pp. 249-267, December 1991.

Jehle, Geoffrey A., "Regulation and the Public Interest in Banking," *Journal of Banking and Finance*, v. 10, pp. 549-573, 1986.

Johnson, Shane A. and Salil K. Sarkar, "The Valuation Effects of the 1977 Community Reinvestment Act and its Enforcement," *Journal of Banking and Finance*, v. 20, pp. 783-803, June 1996.

Johnson, Terri and Forest Myers, "New Community Reinvestment Act Regulation: What have been the Effects?" *Financial Industry Perspectives*, Federal Reserve Bank of Kansas City, pp. 1-11, December 1996.

Kane, Edward J., "Good Intentions and Unintended Evil: The Case against Selective Credit Allocation," *Journal of Money, Credit, and Banking*, pp. 55-69, February 1977.

Lang, William W. and Leonard I. Nakamura, "The Dynamics of Credit Markets in a Model of Learning," *Journal of Monetary Economics*, v. 26, pp. 305-318, 1990.

Lang, William W. and Leonard I. Nakamura, "A Model of Redlining," *Journal of Urban Economics*, v. 33, pp. 223-234, 1993.

Lindsey, Lawrence B., "Detecting Discrimination By the Numbers," *Annual Review of Banking Law*, v. 14, pp. 177-185, 1995.

Ling, David C. and Susan M. Wachter, "Information Externalities and Home Mortgage Underwriting," *Journal of Urban Economics*, Forthcoming 1998.

Macey, Jonathan R., and Geoffrey P. Miller, "The Community Reinvestment Act: An Economic Analysis," *Virginia Law Review*, v. 79, no. 2, pp. 291-348, March 1993.

Marcus, Alan J., "Deregulation and Bank Financial Policy," *Journal of Banking and Finance*, v. 8, pp. 557-565, 1984.

Masulis, Ronald W., "Government Intervention in the Mortgage Market," *Journal of Monetary Economics*, v. 10, pp. 191-213, 1982.

Meeker, Larry and Forest Myers, "Community Reinvestment Act Lending: Is it Profitable?" *Financial Industry Perspectives*, Federal Reserve Bank of Kansas City, pp. 13-35, December 1996.

Melby, Todd, "Over the Rainbow: Bankers Find Lucrative Niche by Marketing to Minorities," *Independent Banker*, pp. 29-30, June 1997.

Miller, Andrew, "The New York Proposal to Revise the Community Reinvestment Act: A Quantitative Step Towards Objectivity and Effectiveness," *Catholic University Law Review*, v. 43, pp. 951-985, 1994.

Mishkin, Frederic S. and Stanley G. Eakins, *Financial Markets and Institutions*, Second Edition, Addison-Wesley: Reading, Massachusetts, 1998.

Moore, Billy Carl, *The Effectiveness of CRA Ratings in Capturing Discrimination in Mortgage Lending*, University of Mississippi, dissertation, 1995.

Munnell, Alicia H., Lynn E. Browne, James McEneaney, and Geoffrey M.B. Tootell, "Mortgage Lending in Boston: Interpreting HMDA Data," working paper, Federal Reserve Bank of Boston, 1992.

Munnell, Alicia H., Lynn E. Browne, James McEneaney, and Geoffrey M.B. Tootell, "Mortgage Lending in Boston: Interpreting HMDA Data," *American Economic Review*, v. 86, pp. 25-53, 1996.

Nakamura, Leonard I., "Information Externalities: Why Lending May Sometimes Need a Jump Start," Business Review, Federal Reserve Bank of Philadelphia, pp. 3-14, January/February 1993.

Newburger, Harriet B., "Discrimination by a Profit-Maximizing Real Estate Broker in Response to White Prejudice," *Journal of Urban Economics*, v. 6, pp. 1-19, 1989.

Roychoudhury, Canopy and Allen C. Goodman, "Evidence of Racial Discrimination in Different Dimensions of Owner-Occupied Housing Search," *Real Estate Economics*, v. 24, pp. 161-178, 1996.

Samolyk, Katherine A., "Banking Conditions and Regional Economic Performance: Evidence of a Regional Credit Channel," *Journal of Monetary Economics*, v. 34, pp. 259-278, 1994.

SAS/STAT User's Guide, Version 6, Fourth Edition, Volume 1, Chapter 18, pp. 519-614, Cary, NC:SAS Institute Inc., 1989.

Schafer, Robert, "Racial Discrimination in the Boston Housing Market," *Journal of Urban Economics*, v. 6, pp. 176-196, 1979.

Schafer, Robert and Helen F. Ladd, *Discrimination in Mortgage Lending*, The MIT Press: Cambridge, Massachusetts, 1981.

Schill, Michael H. and Susan M. Wachter, "A Tale of Two Cities: Racial and Ethnic Geographic Disparities in Home Mortgage Lending in Boston and Philadelphia," *Journal of Housing Research*, v. 4, no. 2, pp. 245-275, 1993.

Schill, Michael H. and Susan M. Wachter, "Borrower and Neighborhood Racial and Income Characteristics and Financial Institution Mortgage Application Screening," *Journal of Real Estate Finance and Economics*, 9: 223-239, 1994.

Shaffer, Sherrill, "Evidence of Discrimination in Lending: An Extension," *Journal of Finance*, v. LI, no. 4, pp. 1551-1554, September 1996.

Shear, William B. and Anthony M. J. Yezer, "An Indirect Test for Differential Treatment of Borrowers in Mortgage Markets," *AREUEA Journal*, v. 10, pp. 405-420, 1983.

Sokal, R.R. and C.D. Michener, "A Statistical Method for Evaluating Systematic Relationships," *University of Kansas Science Bulletin*, v. 38, pp. 1409-1438, 1958.

Spong, Kenneth, *Banking Regulation: Its Purposes, Implementation, and Effects*, 4th ed. Federal Reserve Bank of Kansas City, 1994.

Stein, Jeremy C., "Internal Capital Markets and the Competition for Corporate Resources," *NBER* working paper, 1996.

Stigler, George, "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science*, v. 2, pp. 3-21, 1971.

Stolz, Richard W., "Local Banking Markets, Structure, and Conduct in Rural Areas," *Bank Structure and Competition*, pp. 134-148, 1976.

Teitelbaum, David E., "Recent Developments under the Community Reinvestment Act: 1992-1993," *Business Lawyer*, v. 49, pp. 1299-1306, May 1994.

Teitelbaum, David E. and John M. Casanova, "Regulatory Reform of Retread? The New Community Reinvestment Act Regulations," *Business Lawyer*, v. 51, pp. 831-842, May 1996.

Tootell, Geoffrey M.B., "Discrimination, Redlining, and Private Mortgage Insurance," working paper, 1997.

Walter, James T., Bennet S. Koren, and Grace Sterrett, "Housing Finance: Major Developments in 1993," *The Business Lawyer*, v. 49, pp. 1307-1316, 1994.

Wu, Hsiu-Kwang, "Bank Examiner Criticisms, Bank Loan Defaults, and Bank Loan Quality," *Journal of Finance*, v. 24, pp. 697-705, Sept. 1969.

BIOGRAPHICAL SKETCH

David Michael Harrison was born and raised in small-town Kansas. He received a bachelor's degree in business administration (BBA), with a major in finance, from Pittsburg State University in 1992. In 1994, he received a master's degree in business administration from Wichita State University. His current research interests are concentrated in the area of real estate finance, particularly low-income lending markets. Upon completing his graduate work at the University of Florida, Mr. Harrison has accepted a faculty position at the University of Vermont.

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the Doctor of Philosophy.

Christopher M. James, Chair
William H. Dial/SunBank Eminent
Scholar of Banking and Finance

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the Doctor of Philosophy.

Wayne R. Archer

Wayne R. Archer
Associate Professor of Finance,
Insurance, and Real Estate

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the Doctor of Philosophy.

Joel F. Houst

Joel F. Houston
Associate Professor of Finance,
Insurance, and Real Estate

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the Doctor of Philosophy.

David C. Ling

David C. Ling
Professor of Finance, Insurance, and
Real Estate

I certify that I have read this study and that, in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the Doctor of Philosophy.

Marc T Smith

Marc T. Smith
Associate Program Director and
Lecturer

This dissertation was submitted to the Graduate Faculty of the Department of Finance, Insurance, and Real Estate in the College of Business Administration and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 1998

Dean, Graduate School